DOCUMENT RESUME

ED 403 118 SE 059 074

TITLE	Dissecting Dissection.
INSTITUTION	American Anti-Vivisection Society, Jenkintown, PA.
REPORT NO	ISSN-0274-7774; USPS-002-660
PUB DATE	96
NOTE	33p.; Special edition of the AV Magazine.
AVAILABLE FROM	American Anti-Vivisection Society, 801 Old York Road, #204, Jenkintown, PA 19046-1685 ($1.50/magazine).
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052) -- Reports - Descriptive (141)
JOURNAL CIT	The AV Magazine; v105 n3 spec iss sum 1996
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Biological Sciences; *Dissection; Elementary Secondary Education; Higher Education; *Laboratory Animals; Laboratory Experiments; Science Activities; *Science Instruction
IDENTIFIERS	*Animal Welfare; *Vivisection

ABSTRACT

This journal features articles covering various aspects of dissection. "Biology--The Study of Life" (George Russell) offers students experiments that do not require using invasive procedures. "Animal Cruelty--Behind the Scenes" (Zoe Weil) describes sources of laboratory animals. "Doing without Dissection" (Juliana Texley) discusses objections over classroom dissection and its role in current biology curricula. "Dissection: Paving the Path To Vivisection" (Andy Breslin) discusses ethical principles that link dissection to vivisection. "Dissection & the Law" (Jonathan Balcombe) explores dissection legislation in the United States. "Science Fairs" (F. Barbara Orlans) describes science fair projects that have used animals and suggests humane project alternatives. Resource lists describe computer simulations; charts, models, and other media for animal studies; as well as printed information about dissection alternatives. (PVD)

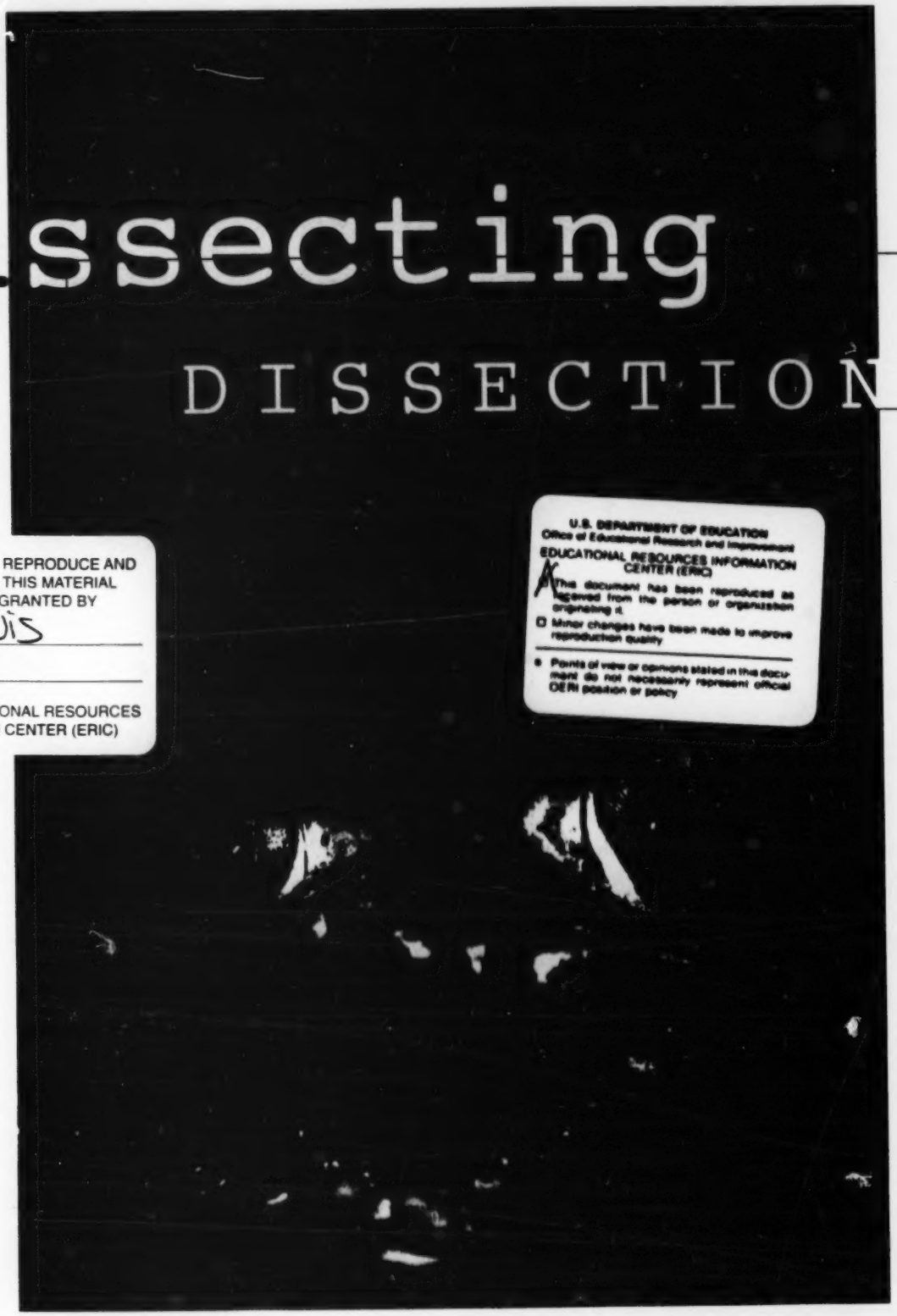
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 403 118

AV MAGAZINE
OF THE
AMERICAN
ANTI-VIVISECTION
SOCIETY

THE AV MAGAZINE
SUMMER 1996

Dissecting DISSECTION



PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL
HAS BEEN GRANTED BY
K. Lewis

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

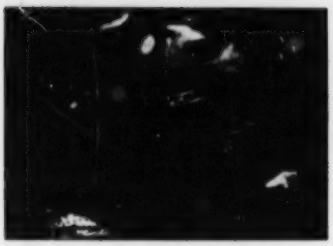
U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

SE059074

BEST COPY AVAILABLE

C O N T E N T S

VOLUME CV SUMMER 1996 NUMBER 3 ISSN 0274-7774



FEATURES

1 **The First Word** TINA NELSON
Doing away with dissection.
The AAVS is here to help.

2 **Biology – The Study of Life** GEORGE RUSSELL
An educator shares his ideas on teaching respect and amazement for animals and our world; and why it is not possible to do so with dissection.

8 **Animal Cruelty – Behind the Scenes** ZOE WEIL
Find out where dissection "specimens" really come from – and what they endure on the way to the classroom.

10 **Doing Without Dissection** JULIANA TEXLEY, PH.D.
Forget those memories or fears of classroom cruelty – welcome to the new biology lab.

14 **Dissection: Paving the Path to Vivisection** ANDY BRESLIN
If we are going to end animal experiments once and for all – we must break the cycle early.

16 **Student Voices • Feedback**
Students of all ages share their struggles and triumphs in finding dissection alternatives in schools and colleges.

18 **Dissection and the Law** JONATHAN BALCOMB, PH.D.
Only four states have dissection laws. Is yours one of them? How helpful are they? What can you do to get one?

22 **Science Fairs** F. BARBARA ORLANS, PH.D.
The cruelest one wins. Grim examples of science fair projects, the current situation, humane alternatives, and what you can do to help.

26 **Dissection Alternatives Hall of Fame**
A sampling of available alternatives in a variety of prices and types.

28 **Dissection Resources**
Information available from the AAVS and other sources to help you learn more and take action.

— COVER/INSERT PHOTOGRAPHY: © JOE MACDONALD

AV MAGAZINE

A PUBLICATION OF THE AMERICAN ANTI-VIVISECTION SOCIETY

EDITORS
Tina Nelson, Dean Smith, Bill Kelly

CONTRIBUTORS
Tina Nelson, Dean Smith, Andy Breslin, Zoe Weil, George Russell, Julian Texley, Jonathan Balcomb, Ph.D., F. Barbara Orlans, Ph.D., Lisa Ann Hepner, Elizabeth Hunt, Lori Kort, Christie Vischer and Elinor Moblegott, Stephanie Shain, and Megan Southern.

Graphic Design/Illustration:
Harris Design, Inc.

The AV Magazine (USPS 002-660) is published quarterly under the auspices of the American Anti-Vivisection Society, **Tina Nelson**, Executive Director. Annual membership dues: $15.00. Third class postage paid at Morgantown, PA. Office of Publication: 801 Old York Road, #204, Jenkintown, PA 19046-1685.

Telephone: 215-887-0816
Fax: 215-887-2088
E-mail: aavsonline@aol.com
Web Site: www.aavs.org

Articles and pertinent information may be submitted to the editors of **The AV** for possible publication. Please enclose SASE for the return of unaccepted material. Letters to the Editor of **The AV** are assumed intended for publication, and may be used for such purposes in whole or in part. We also appreciate receiving pertinent newspaper and magazine clippings, including their source and date of publication.

When sending funds or making bequests, please use our legal title:
The American Anti-Vivisection Society,
801 Old York Road, #204
Jenkintown, PA 19046-1685
Organized and Established in 1883

The individual views expressed in *The AV Magazine* do not necessarily reflect the policy of the American Anti-Vivisection Society.

By Tina Nelson, Executive Director

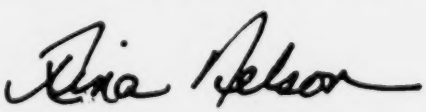
I am excited and pleased to bring this Special Edition of The AV Magazine to our members, contributors, supporters, students, and others. The dissection issue is one of great importance as approximately twelve million animals are killed in the name of "education" each year. The Outreach Department at the AAVS receives an overwhelming number of calls from students regarding help with dissection issues. We provide information on alternatives, how to approach the classroom teacher and school/college administration regarding the use of alternatives, and what provisions exist in each specific state law. In this edition of the magazine, we feature articles written by many professionals covering various aspects of the dissection issue, culminating in the belief that "Dissection Doesn't Cut It."

For instance, the article "Biology, The Study of Life," is written by Dr. George Russell, a physiology/biology professor at Adelphi University, who conveys the message that if biology were taught in a manner that developed a sense of wonder and reverence for life, students would work toward preserving and respecting life, and therefore dedicate themselves to a better and more humane world for animals and humankind. Another article, written by Juliana Texley, Assistant Superintendent for Anchor Bay School District in Michigan, discusses the "new biology" ...how schools can offer excellent programs in Life Science without dissection. As you page through this publication, you will find an enormous amount of information, from individual state laws to how you can effect change in your community.

I am also pleased to announce the launching of the AAVS' Alternatives to Dissection Lending Library. In future months, we will be able to provide students and teachers throughout the U.S. with the latest in alternatives to dissection. This will include: interactive computer programs, videos, three-dimensional models, slide programs, and anatomical charts.

The subject of dissection is one to which I am personally committed, as I too struggled through four years of undergraduate college courses in order to obtain my B.S. in Biology without harming animals. I felt that my struggle was mine alone, and there was nowhere to turn for help. For future generations of children, it is my sincere hope that this special focus issue will encourage and empower you as teachers, as students, as administrators, as college professors, as legislators, as parents... to help put the life back into life science.

I ask you to join the AAVS in OUR struggle to work to end dissection and save millions of animals each year.



WHO ARE WE?

The American Anti-Vivisection Society is a non-profit, international, animal rights organization whose mission is to unequivocally oppose and work to end experimentation on animals used in education, science, and research. We also oppose and work to end all other types of cruelty to animals. The AAVS has a small but very dedicated staff who work tirelessly to achieve the goal of helping animals. We accomplish our mission in many ways and have three major divisions that are directly involved in specific activities.

Animalearn, the AAVS humane education program, offers classes and workshops on a range of animal and environmental issues to tens of thousands of students each year. Our ten instructors travel to schools throughout the U.S. and Canada to teach young and old alike. Our humane education conferences also train activists to become humane educators so that together we may spread the message of compassion to the next generation. Animalearn also publishes a variety of materials, including *Animalearn Magazine* for children. Dissection is an issue which *Animalearn* instructors discuss often at schools, providing information to students about their right to refuse, and to teachers about alternative approaches to biology education.

Our Outreach division publishes various brochures, booklets, and additional materials on vivisection and dissection, as well as other issues. We also attend conferences such as the National Science Teachers Association and the National Biology Teachers Association to make alternatives to dissection available to teachers. The Outreach division also takes direct action on behalf of animals by informing the public as to who, what, when, where, and how animal experiments are taking place.

The Alternatives Research and Development Foundation (ARDF) is the AAVS program that supports the development and utilization of alternatives to the traditional uses of animals. These goals are accomplished by giving grants to scientists and educators producing the new non-animal methods. ARDF also promotes the use of alternatives through seminars, lectures, and workshops.

We ask you to become a member of the AAVS and help us achieve our goal to end animal suffering – until all cages are empty cages.

BIOLOGY

—The Study Of Life—

By George Russell

George Russell is a professor of biology at Adelphi University and editor-in-chief of Orion. *His college lab manual,* Laboratory Investigations in Human Physiology *(Macmillan, 1978), offers students a series of experiments that do not require the use of invasive procedures.*

The last decade has witnessed remarkable advances in the ethical treatment of animals – food animals, animals in the wild, pets and zoo animals, animals in research, animals in teaching. One significant trend has been the search for humane alternatives to procedures causing animal pain and suffering. Issues such as factory farming, cosmetic testing on the eyes of rabbits, and the use of animals in biomedical research are increasingly matters of common knowledge and concern. As one who has long been interested in animal welfare, I have followed these developments with close attention, noting especially those that apply to my own profession, the teaching of college biology, and to the related matter of the high school biology curriculum.

Several events have brought home to me how attitudes toward the use of animals in the college and high school classroom are changing. First, I was asked to write to the Animal Care Committee of Hunter College in New York City on behalf of some undergraduate biology students, both majors and non-majors, who had petitioned for the elimination from the introductory course of the usual frog nerve muscle experiment. In this procedure, the spinal cord of a frog is destroyed with a sharp needle and a preparation of the calf muscle and sciatic nerve is studied in the laboratory.

Not long after, I learned that a sizable number of first-year medical students at Mt. Sinai College of Medicine in New York City had refused to participate in the traditional dog laboratory. In this exercise, anesthetized dogs are operated on for the study of basic cardiovascular physiology. At the end of the experiment the dogs are euthanized. The dissenting students claimed that the demonstrations were without value – they knew in advance what was going to happen – and that they, as aspiring physicians, could not reconcile their dedication to the promotion of health with the pointless taking of animal life.

A few months later I was asked to address a group of New York City high school biology teachers at a forum on "Recently Developed Alternatives to Dissection." One of the speakers, a psychiatrist, told the teachers that dissection and vivisection in high school were simply not necessary, even for students planning to go on to medical school. The most important thing for high school biology students, he said, was to develop a loving attitude toward animals so that they would become caring adults.

These three incidents would have been unthinkable twenty years ago. All three are directly attributable to the work of the animal rights movement, which has brought a new awareness of animal suffering and its alleviaton to people in all fields.

The evident increase in concern for animals and the willingness to question the exploitation of animals for doubtful ends are heartening. But they are, I feel, only a beginning. The Hunter College students' petition against the frog experiment, significantly, was turned down after lengthy debate. We as a society still have a long way to go toward just treatment of the nonhuman world. How far and how fast we can travel will depend very much on whether more young people will develop an attitude of caring and a sense of commitment to the well-being of animals. The responsibility lies very much with those of us who are their teachers.

The attitudes that determine our treatment of animals and the natural world are strongly influenced by how animals and nature are presented as subjects of study in the high school biology curriculum. If the emphasis is largely on the mechanics of living organisms, then teachers should not be surprised that students may be indifferent and uncaring. Taking apart a clock can be an interesting exercise, but when life itself is treated as a kind of mechanism to be disassembled, both literally and in thought, an experience of the living whole and the regard and interest that it can inspire are no longer possible. If, on the other hand, we can help young people to build an affirmative connection with their natural surroundings

and to have a genuine encounter with the living animal, then we may expect them to develop feelings of caring and respect. As the forum speaker implied, students will want to protect and defend what they have come to value. My own interest, then, extends beyond humane treatment of animals to the pedagogical concern of helping students understand and honor animals in their essential nature. For this is the issue that will ultimately determine the future of the animal world.

In what follows I should like to examine two questions. To what extent have humane considerations found their way into the use of animals in high school biology? And how can educators take a new approach to the teaching of biology, one that treats animals as living beings?

A brief review of how animals have been used in the high school biology classroom will help to put the recent advances in humane treatment into perspective.

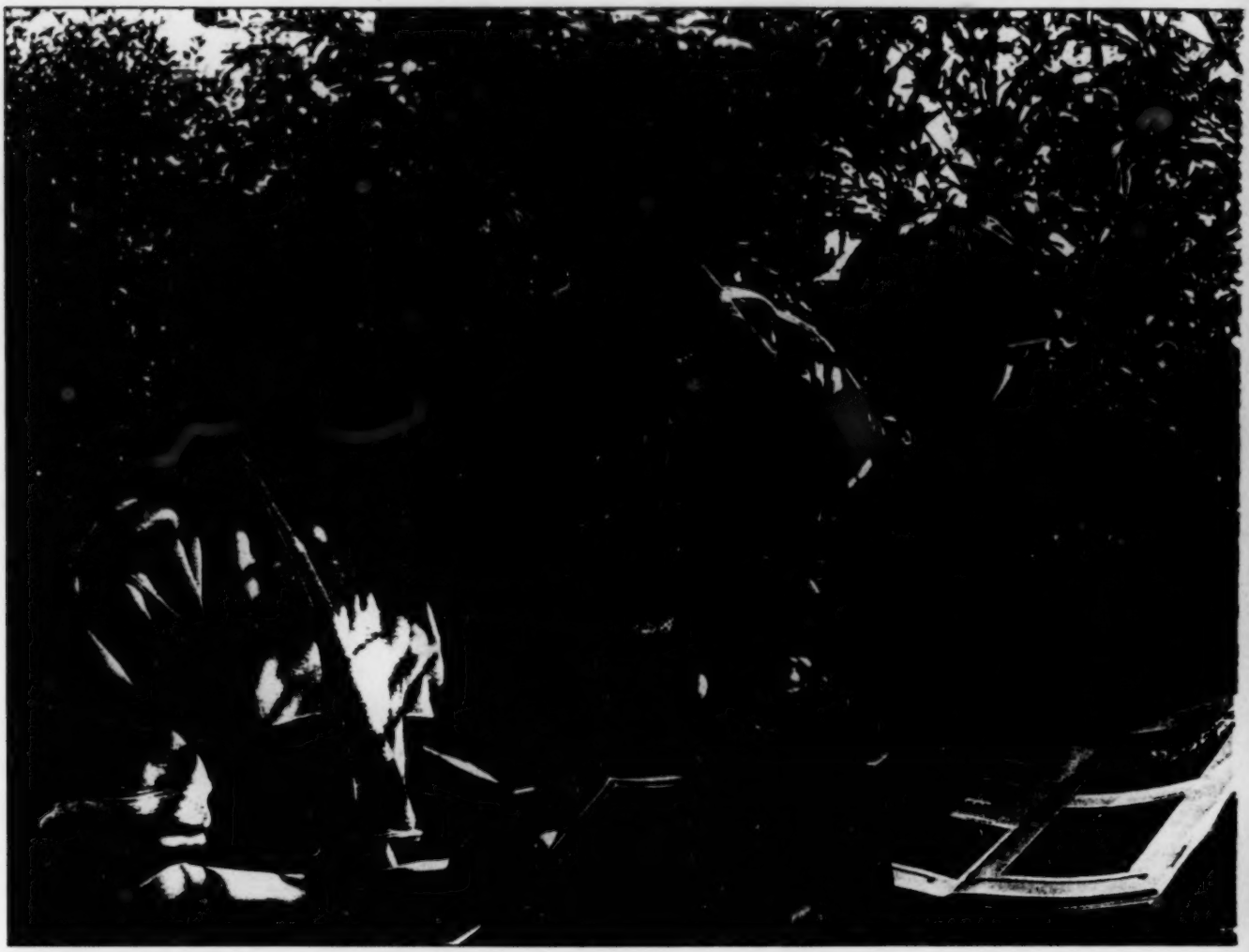
Before 1960, high school biology classes used few living animals, with most of the work centering on the dissection of preserved specimens such as frogs and fish. The tenor of that time was vividly described by William V. Mayer, the now-retired director of Biological Sciences Curriculum Study (BSCS) and probably the foremost biological educator in this country, at a conference in 1980 on the use of animals in the high school curriculum: "Laboratory investigations focused not on biology, but on necrology. In many biology classes, the student never saw a living organism.... The laboratory, as it was called, was primarily a site for dissection. This was conducted on the basis of look-dissect-draw-label-memorize. There was little for a student to gain from such exercises that was not already obtainable in the labeled diagrams included in most textbooks."

The subsequent development of new high school curricula, most notably the influential BSCS materials, with their strong emphasis on independent reasoning and laboratory work, quite literally brought life into the classroom, and by 1969 several million frogs were being shipped each year to educational institutions throughout the United States. The focus of the new curricula was on the nature of biological investigation and the scientific process. The student learned how science proceeds by conducting "hands on" study, and was required to think about what he or she was doing, not merely memorize endless facts. Laboratory-centered investigations on nerve-muscle responses, reflex action, embryological development, and reproductive processes replaced, to a considerable degree, the older, purely descriptive work. To the extent that the expanded use of animals in the classroom brought high school students to a direct study of animal behavior and to an appreciation for the vast diversity of living creatures, it represented a giant step forward in the teaching of biology. To the extent that the students were asked to study life by first killing it – frog pithing was a major element in the new curricula – the innovations were, in my view, both counterproductive and contrary to a truly living approach.

It was a significant development, then, when, largely because of pressure from the animal protection movement, the National Science Teachers Association (NSTA) and the National Association of Biology Teachers (NABT) adopted in 1981 a "Code of Practice " governing the use of animals in high school biology. This code set out careful guidelines for the use of animals in student investigations. The provisions were explicit: "No experimental procedure shall be attempted in mammals, birds, reptiles, amphibians, or fish that shall cause the animal pain or discomfort or that interferes with its health. As a rule of thumb, a student shall only undertake those procedures on vertebrate animals that would be done on humans without pain or hazard to health." The code also provided important suggestions for humane biology projects and was specifically designed to "enrich education by encouraging students to observe living animals and to learn respect for life." Students were urged to study normal functions, including growth, reproduction, behavior, learning, communication, and other life activities.

The NSTA guidelines are unenforceable, but they carry influence and lend credibility to the kinds of experimental procedures they endorse. Several states, including Massachusetts, New Hampshire, and California, have established their own laws with features similar to those of the guidelines, and other states are considering such legislation. Many states, however, permit invasive animal experiments by students. It is highly regrettable, therefore, that in 1985 NSTA seriously weakened the humane intent of the earlier code with a series of revisions and deletions that are designed to allow "greater latitude in [student] use of animals." The new code rules out procedures causing "unnecessary pain or discomfort" to animals, but the key word, of course, is "unnecessary." Many student investigations will be seen as justifiable (i.e., educationally necessary) under the new code, for it is widely believed that superior high school students can be motivated for medical or scientific careers by allowing them to experiment on animals.

In recent years, financial and practical constraints have markedly reduced the number of living animals in the classroom. A 1982 study by



BSCS revealed that 40 percent of the teachers surveyed used no live animals at all, and only one quarter spent more than five hours each semester with living animals. But frog pithing continues to be performed in many high schools, and for some students may represent the only contact they have in the classroom with an actual living vertebrate. Sixty-five percent of the responding teachers did report five hours or more with preserved specimens, and in many schools the traditional sequence of animal dissections, ranging from the earthworm, crayfish, and grasshopper to the fetal pig, is still an integral part of the curriculum.

Invasive animal experiments continue to play a prominent role in high school science fairs, especially those conducted under the aegis of the International Science and Engineering Fair (ISEF). Cancer-causing agents, toxic drugs, radiation treatments, nutrient deficiency experiments, and the use of disease-causing microbes are permitted. In the 1985 competition, sixty-two of the seventy-nine student projects using vertebrate animals caused injury, pain, or psychological discomfort. Obviously the ISEF competition involves only a small number of students, but these are some of the very best in the country, who will surely be the medical and scientific leaders of the future. It is appropriate to ask, therefore, whether their contact with living organisms gives them a deeper sense of appreciation for animals and a commitment to life.

Biology teaching has evolved considerably since the look-draw-memorize stage of the presixties. A major advance has been the recognition that the best kind of learning takes place when students are allowed to investigate and experiment, especially with actual living organisms. But a question of pedagogy still remains unresolved: Should high school students be allowed, for any reason, to carry out experiments in which animals are killed or harmed? An answer to this question will, I think, take us very much farther toward an understanding of why we use animals in the classroom and of the real aims of biology teaching.

For many teachers (and researchers) academic biology is primarily an analytical discipline. The focus is on parts and processes, mechanical principles, and how life is supposed to work. In this approach, analytical intellect, a kind of razor-sharp instrument, takes life apart to discover ever

BEST COPY AVAILABLE

finer details – tissues, cells, molecules, atoms, subatomic particles. The method has been termed reductionist because it reduces explanations to correspondingly lower levels of the hierarchy; tissue processes are explained by cellular activities, cell activities are attributed to underlying biochemical reactions, and so forth. To speak against analytical study would be, of course, to deny the extraordinary achievements of the last fifty years of science, and this is not my intention. What I am suggesting, however, is that we need a radically different approach to the teaching of biology, one that focuses far more on life itself and on the wholeness of living organisms.

Very much of what students learn today is analytical, and as the dissective method delves into ever smaller dimensions, the experience of the natural world recedes. A major aim of biology teaching must be to lead young people toward an actual encounter with nature – animals and plants, natural cycles, geological processes, clouds and weather, and the endless wealth and variety of natural phenomena. For it is the individual relationship, the affective tie between observer and nature, that can ultimately provide the necessary resolve for changes in our treatment of animals and all living things.

In this new approach, we will have to consider the feelings of the young people we teach. Scientists are supposed to exclude subjective feelings from their work, because these are said to interfere with intellectual judgment and distort the search for new knowledge. The feeling life of students, however, lies at the very heart of their connection with the world and what they are studying, and as such must be heightened and nurtured rather than denied or disregarded. It is essential that young people feel inwardly responsive to the material they are considering. Students will eagerly learn the names, parts, and processes of plants and animals they know and for which they feel admiration and respect. In her book *The Sense of Wonder*, Rachel Carson expresses this thought with remarkable clarity: "Once the emotions have been aroused – a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love – then we wish for knowledge about the object of our emotional response." A student can begin to understand the "personality" of a species of bird or insect from patient observation of its life habits, even without knowing its common name. A list of names without the corresponding experience, however, becomes a formidable burden.

I was once asked to cite an example of how one could teach in a manner that stimulates a sense of wonder. In reply I described a study of homing in the Manx shearwater, a seabird inhabiting the western coasts of the British Isles. A young shearwater from Wales was taken by airplane across the Atlantic and released in Boston, 2,800 miles away; twelve and a half days later, the bird had successfully flown the unfamiliar waters of the Atlantic and was back at its nest. On hearing this story students always express astonishment. My questioner responded that the wonder the students felt was in direct proportion to the inexplicability of the example, they were awed by the shearwater's homing because no easy explanation was available. "But," the questioner continued, "how would you teach about ordinary phenomena, for which there are explanations, in a way that develops reverence?"

Franz E. Winkler, physician and author of *Man, the Bridge Between Two Worlds* (1960), wrote that human cognition has two distinct components, one analytical, the other intuitive. Intellect dissects, analyzes, and describes; intuition synthesizes and comprehends. Through intuition we participate in the phenomena of the world; through the use of intellect we stand back and analyze what it is we have experienced. True knowledge involves a proper balance of the two capacities. Modern man, and woman he suggests, have highly developed powers of analysis but lack the capacity to "see into" and understand the world he or she lives in.

In his recent book, *Insight-Imagination: The Emancipation of Thought and the Modern World* (1985), Douglas Sloan further develops this idea and shows that the schooling of imagination (his term for Winkler's intuition) is the urgent task of contemporary education. Teachers must help young people become more attuned to the qualitative aspects of reality. Referring to the student of high school age, Sloan writes, "If concepts are experienced as rigid and lifeless and foreign to the person's own being, they will be employed ruthlessly and without feeling. Or they will be accepted duly and grudgingly, but without real comprehension." But if the growing analytical faculties are grounded in imaginative experience, the young person will eagerly seek new knowledge and meaningful participation in the world around him or her.

With these thoughts in mind, let us look more closely at contemporary biology instruction. As we have learned, animal dissection and, to a lesser extent, live animal experiments still play an important role in the teaching of high school biology. If education's aim is to help students establish a connection with the living world, we must ask what effects these procedures will have.

In dissection, it is quite often the case that the animal, a frog for example, is studied as a model of something else, usually human anatomy or physiology. The frog is not being investigated for its own sake, but rather as a cheap and readily accessible subject for learning about how the human body is supposed to work. But most students, I believe, genuinely wish to study the animal for itself, to learn more about its life activities, to see the creature in its natural environment, and to learn its manner of growth, reproduction, food preferences, and so on. The frog dissection is fundamentally disappointing to them because they do not learn much about frogs or human beings, and what they do learn is not connected with the life of the animal. The earthworm, grasshopper, and crayfish dissections are somewhat different in that the aim here is to learn about these specific animals, but I have never heard of a biology class where the students investigated the living animals in conjunction with their classroom dissections. To put it briefly, very few student dissectors ever learn what a grasshopper or crayfish is really like, and few will wish to undertake a closer study of these animals.

The process of alienation from the natural world is even more obvious in the case of invasive studies by high school students. For many students,

BEST COPY AVAILABLE

vivisection and other forms of animal experimentation can easily lead to insensitivity, callousness, and emotional hardening. For others, such experiments can be deeply disturbing. Commenting on this aspect, F. Barbara Orlans, director of the Scientists' Center for Animal Welfare, writes: "When a student himself hurts or kills an animal, the experience may be traumatic or emotionally desensitizing. Many high school students cannot bring themselves to harm animals as it is against their natural feelings, and they are seriously troubled over the moral problems involved when others kill living beings."

Joseph Wood Krutch, naturalist and literary critic, called attention to the cruel and pointless nature of many so-called investigations in which animals are starved, infected, and inoculated in a variety of ways so that students can witness at first hand the effects of experimental procedures and manipulations, the results of which are already known. (One biology supply house provides nine different deficiency diets and appropriate test animals to let students observe various forms of malnutrition.)

In point of fact these studies are not experiments at all; they are simply demonstrations. In no way do they give the students a true experience of research or the joys of discovery.

Emphasis is often placed on the need for vivisection and other forms of animal experimentation to interest young people in medical and scientific careers. In my opinion this argument has been greatly overstated, particularly in the matter of premedical studies. Has it been clearly demonstrated that career choices in human or animal medicine are promoted by allowing high school students to dissect living tissues or perform toxicity tests? Financial incentives aside, many young people are inspired to pursue health related careers by experiences with serious illness, part-time employment with a vet or in a health clinic, or from an idealistic commitment to a helping profession. Surely one wishes to nurture medical and scientific interests, but not at the expense of students' compassion and devotion to life itself.

These considerations lead me inescapably to the conclusion that invasive procedures and animal dissections have no place in the high school biology curriculum. Most young people of my aquaintance, especially those from urban and suburban settings, have little familiarity with living nature. An overly analytical approach, especially one in which animals are harmed or killed, tends to alienate the student and sever the affinities that make real learning possible. Taught by these methods, students learn the mechanics of life, but they do not establish the kind of caring, participatory relationship with the natural world which, I have tried to show, is the point of it all. Biology is, after all, the study of life.

What I shall offer as specific proposals for a new approach to biology teaching are, in each instance, methods that I myself have used or have known others to employ with success. I acknowledge the existing limitations of time, facilities, and financial resources that render impossible much of what one would like to do, such as extensive field work and other outdoor exercises. Nonetheless, it is my hope that in the spirit of the educational ideal I have articulated here, teachers will wish to try out some of the ideas that follow and develop others of their own.

I would argue that it is entirely possible to replace invasive experiments on animals with humane alternatives. Students can be presented with a wide range of challenging, "hands on" experiences. Experiments using bacteria and other microorganisms; mammalian cell cultures; the study of living animals by nonintervening methods; tests conducted by the students on themselves and one another for various biochemical and physiological factors – all these easily meet the pedagogical requirement that students learn by doing. In my mind no experiment by high school students justifies the infliction of pain or suffering on sentient creatures, and humane alternatives do exist.

In my own college teaching, I have used nature writing and animal literature to open new avenues of study for students of biology. In a course for nonmajors I have required a wide assortment of paperback books as supplements to the basic textual materials. Through dramatic literary examples, students can discover the adventures and rewards of studying natural history and come to see their own corner of the world as a living laboratory.

By now it is as well known that a rat will sicken and die without certain minerals and vitamins as it is that he will die if given no food at all. Would anyone learn anything by poking out the eyes in order to prove that without them animals can't see?... Taught by such methods, biology not only fails to promote reverence for life, but encourages the tendency to blaspheme it. Instead of increasing empathy it destroys it. Instead of enlarging our sympathy it hardens the heart.

JOSEPH WOOD KRUTCH

3

College students are intrigued, stimulated, and moved by Jane Goodall's books on wild chimpanzees, Farley Mowat's *Never Cry Wolf* and Iain Douglas-Hamilton's study of the elephants of East Africa. (Lorenz, Fabre, Barry Lopez, R. D. Lawrence, Robert Leslie, and numerous others also offer fascinating insights into the animal world.) For these young people the study of biology assumes a new and exciting dimension, and many look for opportunities to observe wild creatures in their own surroundings – rabbits, squirrels, mockingbirds, butterflies, orb spiders, and many others. Biology can be for young students the beginning of a lifelong study of natural history that brings great personal enrichment and satisfaction.

"We need a radically different approach to the teaching of biology, one that focuses far more on life itself and on the wholeness of living organisms."

I also use films to illustrate dramatic living phenomena that students could not otherwise observe. ***The Birth of the Red Kangaroo*** (International Film Board, 1965), for instance, depicts the birth of a tiny, pink, sightless creature roughly the size of a bean, and its subsequent journey over the mother's abdomen into the pouch. Details of marsupial reproduction are presented in a vivid and engaging manner. ***Wolves and the Wolfmen*** (MGM, 1972) is surely the most successful film I have ever shown. No one who sees it will ever view his canine pet again with quite the same eyes, and students are left with many questions about dominance relationships, natural population controls, and the ethics of using airplanes to hunt a magnificent wild animal. My one reservation about films in the classroom is that they should not become a substitute for what the teacher him/herself can and should be doing. A film showing a scientist lecturing or explaining concepts with diagrams is not at all what I have in mind.

My final suggestion has to do with a more imaginative way of viewing the world of mammals and its relation to the human being. ***In the Autumn 1985 Orion***, Mark Riegner presented a system for classifying mammals based on the work of Wolfgang Schad. In this scheme, the human form, general and unspecialized as it is, is seen as a central, unifying element among other mammal forms. Animal forms exaggerate and specialize particular aspects of the human form. "Man," Riegner writes, "maintains a delicate balance among qualities that appear in one-sided development in the various mammals. The equilibrium seen in the human being can only be found in the mammals when the class is taken as a whole." If three representative mammals – a rodent, a carnivore, and an herbivore – are studied with special reference to their identifying qualities, the validity of Schad's scheme can be examined.

Looking at animals in this way, students can be led by observation and reading to a closer acquaintance with a variety of mammals. They learn about overall morphology, diet and nutrition, tooth specialization (rodents have accentuated incisors, carnivores have exaggerated canine teeth, and herbivores highly developed molars) and basic ecology. But what is most important, these findings can now be related to the human form. The idea that the human form might be the key to an understanding of mammals goes very much against the grain of contemporary biological thought, but I believe nevertheless that the approach is an enormously fruitful one and that Schad's scheme has the capacity to awaken in students a lively interest in the study of mammals. In working toward a new way of teaching biology, several issues are at stake. The first is the humane treatment of animals, and the avoidance of animal suffering. But as with all the other issues involving animals, humane treatment is not enough. Required is a deeper understanding of why we use animals in teaching, and what it is we wish to teach. My ultimate concern is the students themselves, and how they relate to the world.

I have sketched out a few ideas centered on the living animal and hope that others will find validity in this effort. My suggestions are not meant to replace basic topics currently being taught. My intent is rather to call for a new emphasis to counterbalance what is otherwise a primarily analytical focus in biology instruction. Molecular genetics, cell biology, and biochemistry are extremely important areas of modern biology, but they are very far removed from the actual life of plants and animals.

Any teacher who is willing to try out some of these suggestions, even on a modest scale, may find unexpected success, for most young people today eagerly seek meaningful relationships in what is for them an increasingly dark and uncertain world. The message I have tried to convey is a very simple one: If biology were taught in a manner that developed a sense of wonder and a respect for life, and if students felt inwardly enriched from their studies, they would make it their lifelong goal to preserve and protect all life and would, I believe, dedicate themselves to a better and more humane world – for animals and for humankind.

BEST COPY AVAILABLE

ANIMAL CRUELTY

BEHIND THE SCENES

By Zoe Weil

Zoe Weil is the Education Director of The AAVS

Last month a biology teacher called Animalearn (the humane education program of the AAVS) to request a presentation for her students about dissection. She told me that her students were going to be dissecting the following week, and while most of them were very much looking forward to the animal lab, a few said they didn't want to do it. Would I, she asked, come and speak to the class about why it's good to dissect, and how the animals used are plentiful? I realized, to my amazement, that despite having received our Animalearn brochure detailing the many humane education programs we offer, this teacher mistakenly believed that we supported dissection!

I explained that I, like the students who were refusing to dissect, opposed dissection, and couldn't do the presentation she was requesting. I listened as she described the animal lab as creating great enthusiasm among her students, and then shared with her the cruelties which the animals undergo before they end up in her lab.

I asked her where she gets the carcasses, and she told me they come from Carolina Biological Supply Company, which is the largest supply company for dissection carcasses in the country. Was she aware of the undercover investigation which revealed shocking mistreatment of the animals, I asked. The answer was no, but she was willing to hear about it. I sent her a copy of video footage filmed undercover at Carolina Biological and Wards Biology (another large supply company).

What have undercover investigations and video footage of biological suppliers revealed? What does happen behind the scenes? What is hidden from teachers, who, every year, purchase millions of animals' bodies for their science classes thinking that dissection is simply a terrific and exciting way to learn anatomy?

Undercover footage of the largest supply companies, and investigations of the animal dealers who supply cats and dogs to these companies, have revealed widespread animal cruelty and neglect. Videotapes have shown workers stuffing cats into wire cages by poking and prodding them with metal hooks. The cages filled with cats are jammed into gas chambers, but because there are so many cats stuffed into each cage, some are still alive after gassing. These cats, together with the dead ones, are hooked up to formaldehyde infusion machines, literally being embalmed alive.

Where do the cats come from? While many come from animal shelters and humane societies, quite a large number are stolen. Investigations have uncovered rings of dealers who clean out whole neighborhoods of cats. Some supply houses purchase dead cats from Mexican dealers who pay children $1.00 per cat. Entire villages have their cats disappear as kids collect them for cash. After being stuffed into burlap sacks, the cats are killed by being drowned in barrels of water.

Other animals don't fare much better. For rats, live embalming is not uncommon, and footage reveals the animals kicking wildly as the formaldehyde enters their body. With crabs, no effort at all is made to euthanize or anesthetize the animals before they are embalmed. Dogs, frequently used by veterinary and medical schools and in advanced biology classes, are often horribly abused, flung into trucks with choking sticks, with many still alive after gassing. Like cats, many come from shelters, but others are stolen.

What of the more commonly used frog? The teacher with whom I spoke may very well have been using frogs in dissection since she referred to the animals as plentiful. Frogs used in dissection are normally caught in the wild, suffering the fear of capture, the stress of transportation, overcrowding, extremes of heat and cold, transport in the mail, and ultimate death. Since the bottom line for supply companies is profit, not humane treatment, frogs, like cats and dogs, are subject to significant abuse and cruelty.

And what about fetal pigs? Should we concern ourselves with animals who are simply byproducts of the meat industry? Fetal pigs are obtained when hogs who are pregnant are slaughtered for food. Useless to the

BEST COPY AVAILABLE

pork industry, the fetuses are sold to biological supply companies for use in dissection, creating an additional profit for the hog producers. Hog production, for the great majority of pigs in the U.S., is horribly cruel. Pregnant sows are kept in tiny stalls on hard floors in huge buildings, unable to turn around, to build nests, to breathe clean air, to roll in the mud, to socialize, or to be even moderately comfortable. When it is time to give birth, they are forced into even smaller farrowing crates, where they remain, suckling their young until the piglets are taken away after a few weeks. The piglets wind up in boxes or cages, crowded together while they are fattened for slaughter. Meanwhile their mother is re-impregnated. The process continues until the sow no longer produces enough piglets, and she is forced onto a truck with a metal prod to be sent to slaughter. By this time, the sow usually has lung disease caused by breathing the fumes from the waste of hundreds of pigs confined together. She may also have ankle and foot deformities caused by standing on hard floors for her whole life. While not every farm in America raises hogs in confinement factories, approximately 75% of hogs are raised in this manner, and the trend toward factory farming continues to grow. By dissecting fetal pigs, students and teachers are playing a role in this terribly cruel industry.

If teachers and students were to see the conditions behind the scenes at biological supply companies or factory farms or frog collection sights, it is unlikely that they would want to continue dissection. Because the shocking reality of animal cruelty is hidden from public view, however, most people continue the dissection tradition without much thought or consideration.

It is up to those of us who do know the horrifying truth behind each carcass to teach teachers and students. *Classroom Cut-Ups*, the video put together by PETA using the undercover footage described above, is available from the AAVS (see the enclosed catalog). It is an important investment for the animals. Virtually every student who sees this video is strongly affected. Many refuse to dissect, saving countless animals by their choice. Many teachers who see the film reconsider dissection in their classrooms, saving countless more. But few will make humane choices if they remain unaware of the reality behind the scenes.

Deciding to share your knowledge about the painful reality behind dissection is only the first step. How we share the information is equally important. When I spoke to the teacher who wanted me to promote dissection among her students, I had to take a deep breath and not become angry or outraged that she wanted me to convince her students that dissection was just fine. In order to really help the animals, I needed to be honest and open, listening respectfully without shying away from sharing my opinion. I think that it is largely because I responded to this teacher with respect that she still wanted me to come to her classroom to offer a presentation (albeit a very different one!). Because I did not argue with or berate her, she was interested in seeing the undercover video footage. Now the animals have an opportunity to speak to her in a way that my words could not. And I still have an opportunity to teach her students. Each of us can let the animals speak and make a difference. It is up to us to help carry their voice to as many students and teachers as we can.

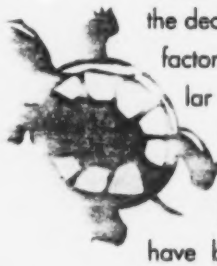
Dissection's Environmental Toll

Not only does dissection desensitize students to animals, pave the way for vivisection and cause intense suffering and death to millions of animals, it also has significant environmental consequences. Consider the following:

• One of the most commonly dissected animals is the bullfrog. Bullfrogs used in education have traditionally been, and continue to be, caught in the wild. While it is difficult to determine the percentage decline in frog populations in the U.S., one educated guess estimates a 50% decline between the mid-1950s and the early 1970s. In 1969 alone, U.S. suppliers shipped 9 million frogs for education and research purposes. Due to the decline in frog populations in the U.S., Mexico and Canada currently supply frogs for American schools.

• Frogs help to control insect populations. In fact, as frog populations have declined in different parts of the world, insect populations, including mosquitoes carrying malaria, have increased, threatening, among other things, human health.

• Another commonly dissected animal is the turtle. Like frogs, turtle populations are in severe decline. While it is difficult to determine all the reasons for the decline, collection for dissection is a significant factor. Adult, female red-eared sliders – a popular turtle "specimen" – are removed from the wild at a rate of 100,000 yearly in order to replace breeding stock on turtle "farms." Due to the decline in population, efforts have been made to have the red-eared slider placed on the list of endangered species. Unfortunately, since these animals are not yet listed, collection continues in the Southeastern U.S., and the turtle population continues to decrease.



-Z.W.

Information supplied by: The Ethical Science Education Coalition (ESEC) 167 Milk St. #42, Boston, MA 02109-4315, (617) 367-9143

DOING WITHOUT DISSECTION

What's high school biology without frogs? Plenty says this school administrator.

BY JULIANA TEXLEY

Juliana Texley is assistant superintendent for curriculum in the Anchor Bay School District in New Baltimore, Mich., and editor of The Science Teacher magazine.

"I REMEMBER BIOLOGY," parents often begin at their annual conference with the teacher. "That was when I dissected that terrible-smelling frog." The odor and distaste the dissection experience evokes have been among the most pervasive memories of secondary school science for more than a century. But in the 1990s, environmental consciousness, curricular concerns, and political pressure on schools and school boards have changed biology dramatically. Today, teachers often respond to a reminiscing parent, "But we don't do that any more."

The decline of dissection has not come about quickly. Until fairly recently, biology as a secondary school course had changed relatively little since it was instituted at the turn of the century. A short introduction to the microscopic world preceded a frantic race through complex topics in biochemistry for students who had not studied introductory chemistry. Then followed a review of genetics principles discovered in 1864. The course finished with a long, leisurely stroll through the phyla of plants and animals in the context of their evolutionary development – with dissection as a prime tool.

Neither pressure by Creationists [which temporarily caused removal of the term "evolution" from the textbooks but never excised the evolutionary framework from science teaching] nor innovations by post-sputnik curricular projects managed to change that standard pattern of study. In dissection, health concerns about formaldehyde forced a quick change to new packing solutions for specimens [many resembling antifreeze] and requirements for wearing safety eyewear. But even an environmental plague of a disease dubbed "red leg", which nearly decimated the already slim population of one species of North American frog [a staple of the biology lab], didn't discourage traditional biology teachers.

Ill Prepared Teachers

Teacher demographics are partly to blame for this curricular inertia. Until quite recently, many states and school systems required only one science course for high school graduation. That single course was nearly always biology or life science. With science teachers in short supply, many physical education teachers found a life science endorsement within easy reach: All they had to do was take a few zoology classes to add to their health education credits. No other science credential can be obtained by taking courses out of sequence or at random in this way.

Soon, physical education majors who had minors in life science became so commonplace that surveys by the National Science Teachers Association [NSTA] found nonmajors teaching more that half of the life science classes in the United States. Those teachers were far less likely to be prepared in biochemistry, genetics, or microbiology than to have a passing knowledge of zoology. As a result, many biology classes were taught by instructors who were far more comfortable with dissection than with other science activities.

That trend had a marked effect. In the absence of a national curriculum in life science, encyclopedic text-books became the norm. Less able teachers could select narrative chapters on the animal kingdom and illustrate them by dissection of dead specimens. Groups that led thoughtful challenges to this pattern, such as the Biological Sciences Curriculum Study [a post-sputnik organization that teamed scientists and educators to develop curriculum] seldom had much of an impact on the teaching profession, because of the limited background of so many teachers.

Court Challenges

What finally forced some changes in traditional biology coursework was pressure from animal rights groups, which supported a series of successful court challenges to dissection during the 1980s.

The first such case arose when Jenifer Graham, a California high school sophomore, refused to dissect a frog but instead offered to substitute college-level research on amphibian behavior. As evidence of her commitment, she demonstrated a personal history of animal rights activism and vegetarianism. After school officials adamantly refused to honor her request, her grade was lowered from an A to a C. Backed by the Humane Society of the United States and other groups, Graham challenged the grade in the state circuit court and ultimately in the state supreme court.

Graham's case became a forum for long-delayed debate on what was appropriate in a required science course. In that debate, the school officials least effective argument was that the dissection experience was "necessary for college." Surveys and briefs from college faculty failed to establish that any single experience or the content of any single course was necessary for college success.

Graham persisted and ultimately won her point: The California Supreme Court ruled that teachers could require students to dissect only frogs "that had died from natural causes." [The ruling led biologists to conjure images of frantic teachers hovering in swamps waiting for the untimely demise of amphibians.] Two subsequent court challenges in different states have supported the position that student objections to dissection must be considered in designing biology coursework.

Surprisingly, the resistance to these changes came slowly. From a profession that has marshaled the forces of Nobel Prize winners, politicians, and even national church groups to defeat legal challenges to the teaching of evolution, the lack of immediate reaction to this new "intrusion" into the curriculum seems incongruous.

An Outdated Curriculum

Why have so few objections been raised to legal decisions mandating changes in biology teaching? The answer, from the best trained and most active teachers, is that the zoology-plus-dissection pattern of the traditional high school biology course has been outdated for at least 50 years. Comparative zoology has accounted for the lion's share of the curriculum we have offered students for almost a century, but it has played a relatively limited role in modern biological research.

In a study of more than 7,000 science teachers, a joint committee of NSTA and the National Association of Biology Teachers determined that the key concepts of modern biology are cell biology, energy use, genetics, evolution, systems, ecology, animal behavior, taxonomy, and the relationship of science to technology and society. [By "taxonomy" the committee means the science of how biologists identify and trace the evolution of organisms, not the Latin names that were developed as a result.] Note that detailed studies of individual animals are conspicuous by their absence from this list.

Educators agree that science should involve hands-on laboratory experience. But the lack of training and preparation that persists among many science teachers means that dissection is often the only hands-on experience they know. And that raises a disturbing spectre: A move away from dissection that leaves students holding nothing but textbooks would be far from an improvement.

The New Biology

The uneasy status of litigation and curricular change has left school administrators and school boards uncertain: Can schools offer excellent programs in life science without including dissection? Certainly they can.

The consensus, from recent statements from the National Academy of Sciences, the American Association for the Advancement of Science, and the various professional teacher groups, is that the study of biology should be scientific-active, inquiry-oriented, and geared toward preparation for the 21st century. Studies, whether involving dissection or not, must emphasize their relevance to humans and to the environment.

Laboratories in the "new biology" look far more like chemistry labs and will require more complex equipment, facilities, and safety precautions than found in today's biology classrooms. Many of the rooms designed for biology classes in schools built in the 1950s and 1960s will need major renovation to be suitable environments for learning in the 1990s. And so will many of the teachers; training in labs considered standard today, such as genetic engineering and animal behavior, was completely absent from teacher education programs even five years ago.

Another thorny problem for school administrators is establishing curriculum guidelines that will help fend off student court challenges. A California school

system's obstinate response to Jenifer Graham's valid objection to dissection cost the school board thousands of dollars in legal fees. Unless a school system confronted with a similar challenge is willing and able to tap the advice of experts in a specific curriculum, the validity of a student's challenge might be difficult to establish.

Although the issue has no simple answers, several guidelines have emerged from the California case and the curricular discussions that have followed. First, curriculum in required coursework should be directed toward what students will need to know as adult citizens in society – not what college students might [or might not] need to know. Potential applicability to undergraduate work seldom justifies a specific classroom activity; activities must be designed with an eye to their effect on the attitudes and thinking patterns of all students, not just the college-bound.

A second, more practical consideration that emerged from the court challenges is that school officials should consider students' histories in weighing the validity of their objections to a specific school experience. Jenifer Graham's history as an animal rights activist and vegetarian was a strong defense, establishing that her refusal to take part in assigned dissection was not a whim or a rebellion against school. Not every student challenged to a class assignment can be backed by such evidence of commitment.

Finally, cases such as Jenifer Graham's underscore the importance of keeping in touch with trends in the profession through national professional groups. Had Graham's teachers been taking part in the growing dissection debate that was going on in professional meetings and journals, the school system would probably have realized it was trying to defend an untenable position. No single administration or board can keep in touch with all the trends, issues, and controversies in secondary curricula. But professional faculty members who have ties to associations, publications, and meetings can follow the trends in their own subject fields.

In today's life science classes, dissection hasn't become extinct but its role is far smaller than it used to be. Teachers who have chosen to retain selected dissection activities illustrate more advanced ideas. And they are providing alternative activities for students who find dissection unpleasant or unnerving.

The odor of preservatives has not disappeared from life science classrooms, but it is far less pervasive in a curriculum that is looking forward to the next century. When today's students become parents, they will come to parent-teacher conferences with more exciting memories of lively life science.

WHAT IS THE FUTURE OF LIFE SCIENCE?

It's rare when a profession can come together to establish high standards for itself through consensus. The new National Science Standards [published by the National Science Research Council in 1995] represent just such an effort. They define a great vision of what science classrooms should be like in the next century.

The Standards' vision for life science will require real changes in mindsets. They emphasize inquiry in six areas of content:

- cell biology
- molecular genetics
- evolution
- biochemistry
- environmental science
- animal behavior

Veteran biology teachers have been shocked by the list—not at what is there, but at what is missing. Gone are the long weeks of study of comparative invertebrate and vertebrate anatomy! Where will the dissections fit?

The Standards ask that teachers help their students inquire and construct strong ideas about science process and content. They ask that exploration occur every day, in an open environment. There is no clear statement about the traditional experiences of dissection. But it is easy to infer that old style dissections, performed as they were in average classrooms, simply don't make it as Standards-based science.

Over the past century, there have certainly been many high school classrooms where exciting, high-level studies of anatomy have occurred through dissection. There are many master teachers who encourage advanced students to consider evolutionary adaptations, intraspecies variation, evidences of niche through digestive studies, and studies of pathology through examination of specimens. But in most secondary biology classrooms, the experience of cutting open a sacrificed specimen has been anything but intellectual!

Pull the specimen from the bucket. Make the appropriate sounds of disgust. Assume the proper gender role [girls wither, boys act aggressive]. Then quickly open the specimen and label the parts on a ditto. Get the desk cleaned up before the bell rings...

15

In classrooms where life science is moving toward more inquiry, the issue is not the subject of the lab but how the lab is structured and accomplished. Students are encouraged to generate and explore questions – not to simply memorize answers. That's why many teachers have abandoned dissection.

Meanwhile, in their journey toward the Standards, high school biology teachers have had to adjust to thoughtful abandonment of many treasured units. "Less is more" is not just a cliche! It is the reality if you want to spend significantly more time on difficult topics such as molecular genetics or photosynthesis. And there is one major content area that is totally new to many teachers – the behavior of live, healthy organisms!

Behavior is an area of intense fascination to most students. From the simple tropisms of plants to the complex vestigial patterns of the family pet, the science of behavior is a great subject of inquiry for high schools. But maintaining the cultures and learning the techniques to quantify observations will all require time – time taken from traditional assignments like dissection.

Teachers must also resist the natural adolescent impulse to "experiment on" organisms. Behavioral studies involve appreciation of the natural activities of organisms in as close to native settings as possible, not their reactions to stress. Students who have grown to associate scientific investigations with the traditional controlled experiment often expect to "do something to something and see what happens." Behavioral studies encourage observation and appreciation.

For teachers moving toward the Science Standards in the 21st Century, there simply isn't time for traditional dissection routine.

The old-fashioned experiences were just too memory-oriented and did not allow students to explore and construct big ideas about science. They encouraged the impression that science was just a bunch of facts – labels on diagrams – that needed to be stored and repeated on tests.

When I meet students from the 70's and ask them to reminisce about my biology class, they often describe a dissection. What a memory! My students from the 80's and later usually describe their independent investigations which were sustained over many weeks. I am much prouder of the latter – experiences that are much closer to my vision of what I hoped to accomplish then and in the future. Tomorrow's students will have far more excitement and more memories of exciting inquiry to take with them from biology classrooms.

D S Quiz O N

1. How many animals are killed in dissection classes each year?

a. 150,000
b. 500,000
c. over 2,000,000

2. How many turtles are caught from the wild each month to replace breeding stock on turtle farms (where dissection supply companies get their supply)?

a. 500
b. 10,000
c. 100,000

3. What percentage of frogs used for dissection are wild-caught?

a. 100%
b. 15%
c. 70%

4. It was recently discovered that cats for dissection were being bought from Mexican children. How much did each cat cost biological suppliers?

a. $4.50
b. $1.00
c. $15.00

5. The period from the mid – 1950's to the early 1970's found the U.S. focused on science eduction because of the space race. During this time frog dissection became the popular method to teach vertebrate anatomy. How much did the U.S. frog population drop during the years 1956 – 1971?

a. 85%
b. 50%
c. 15%

6. What is the species of turtle most often used by the biological supply industry?

a. snapping turtle
b. box turtle
c. red eared slider

7. Turtles have to be wild caught because the market price for them is so low that is is economically unfeasable to raise them. What is the wholesale price of a turtle used for dissection?

a. $1.00 – $2.00
b. $5.00 – $7.00
c. $3.00 – $5.00

8. Cats and dogs used in the dissection industry often come from buisness people who have been accused of stealing pets. What is the title of these people?

a. bunchers
b. B - Rated Dealers
c. Class B Dealers

9. How many alternatives to dissection are presently available?

a. 300 – 500
b. 30 – 50
c. 100 – 200

10. Where do the majority of turtles used for dissection in the U.S. come from?

a. Louisiana
b. California
c. Maine

Answers: 1. c 2. b 3. a 4. b 5. b 6. c 7. c 8. c 9. a 10. a

BEST COPY AVAILABLE

DISSECTION: PAVING THE PATH TO VIVISECTION

BY ANDY BRESLIN

Andy Breslin is the Outreach Coordinator of The AAVS

The issue of dissection has never received as much attention and fanfare as the issue of vivisection, from either animal rights proponents or the popular media. Perhaps people believe that animals in dissection do not suffer as much as those used in experimentation. (As a number of articles in this magazine will attest, this is hardly the case.) Perhaps it is the fact that only eight to twelve million animals die for dissection, rather than the thirty to fifty million who die for vivisection, which accounts for this difference in attention. I think it is safe to say that the issue is of paramount importance to each one of those eight to twelve million animals. More to the point, dissection cannot be separated from animal experimentation.

The practice of vivisection rests firmly upon a few concepts which are rigidly implanted in the consciousness of our society, principally that the use of animals for human purposes is ethically acceptable, and that knowledge gained through the use of animals cannot be obtained in other ways.

These bitter seeds are sown within the minds of generations of students with that rite-of-passage: The first dissection.

Usually a frog, she arrives in a bucket with many of her former comrades. Dripping with formaldehyde, the frog is then pinned to a waxy rubber dish and unceremoniously cut into pieces.

This is the student's first encounter with animals in science. It amounts to nothing less than a lesson to the effect that animals exist for humans to use. Later in their scholastic career, the lesson is repeated with a fetal pig, just in case it didn't sink in the first time.

This is not to suggest that this is the intention of instructors. Indeed they doubtless believe that they are simply teaching about anatomy, but this subconscious lesson can not be denied. By the time a student has graduated from college with a degree in biology, this lesson has usually been repeated many times. Is it any wonder that the message of animal rights proponents then falls upon deaf ears?

In addition to systematically eroding compassion for animals, dissection also begins laying the foundation for an uncreative approach to science. Just as there are many alternatives to dissection which can accomplish its objectives equally well or better, so too are there alternatives to the use of animals in all aspects of experimentation. Students are not taught, however, to explore the different possibilities available to them. Instead, they are taught to unquestioningly accept the status quo, and use animals for no better reason than that is the way it has always been done.

If a student manages to maintain both her or his compassion and scientific creativity, and still wishes to pursue a career in life science, she or he must then contend with a more-often-than-not hostile administration which may be resistant, to say the very least, to any attempts to challenge its academic authority.

Oftentimes, students will have to convince one instructor after another to allow them an alternative project, as the administration often leaves this authority up to the individual instructor. A particularly stubborn instructor, who is totally unwilling to concede to the students' wishes, can send them back to square one.

Often, instructors will grant an alternative means of study, but will be compelled to prove their theory that dissection is indispensable, and will devise testing procedures which are actually much more difficult than those for the dissecting students.

The difficulties and obstacles placed before biology students who wish to avoid dissection are often overwhelming. The stress and emotional trauma resulting from a blatant denial of their basic ethical principles is immense. Not surprisingly, many students abandon pursuit of careers in science rather than face such seemingly insurmountable opposition.

And now here is the kicker: When these compassionate students are finally dissuaded from pursuing a career in life science because they are faced with total hostility to their beliefs, the mainstream scientific community has the arrogance to defend the practice of vivisection on the grounds that few "accredited" scientists are highly critical of it!

If this reasoning were any more circular, it would roll away. Unfortunately, it remains in place, and the cycle of dissection and vivisection continues.

Dissection paves the path for vivisection in a number of ways. It subtlely erodes a sense of compassion for animals, reinforcing the idea that they are objects and not subjects unto themselves. It stifles creative scientific thought, discouraging students from thinking that there is more than one way to approach scientific inquiry. It actively discourages people with a sense of compassion for animals from entry into the scientific community, and thus the system is further entrenched.

If we are to make a difference, we must break the cycle. We must work to ensure that voices of compassion are not barred entry into the hallowed halls of science. We must work to promote alternatives and students' rights policies at all education levels. It's time to put the life back into life science.

" The practice of vivisection rests firmly upon a few concepts which are rigidly implanted in the consciousness of our society, principally that the use of animals for human purposes is ethically acceptable, and that knowledge gained through the use of animals cannot be obtained in other ways. These bitter seeds are sown within the minds of generations of students with that rite of passage: The first dissection."

If we are to make a difference, we must break the cycle. We must work to ensure that voices of compassion are not barred entry into the hallowed halls of science. We must work to promote alternatives and students' rights policies at all education levels. It's time to put the life back into life science.

BEST COPY AVAILABLE

STUDENT

Cruelty-Free Degree

When I was in college, I faced one of the most difficult challenges of my life: trying to study biology without dissecting animals. Ultimately, I succeeded. Pursuing an education without compromising my beliefs was a struggle no student should have to endure.

During my last year of college I devoted my time to making sure that no student would have to go through the ridicule and persecution that I did, if they, too, chose not to dissect. While my personal victory of not dissecting and achieving an "A" on the practical exam was certainly fulfilling, the most rewarding aspect of my fight against dissection was securing the right to refuse for future students.

When I first requested an alternative to dissection my teaching assistant snickered, saying he didn't think it was possible. I then went to my professor with the request. After a lengthy confrontation he reluctantly agreed that I didn't have to dissect the fetal pig, but that I would still be required to study fetal pig anatomy. All the while he stated that my education would suffer in the long run.

Upon reflection, my education, indeed, didn't suffer; in fact, it thrived. I felt like I learned more than most students who performed the dissections. It is known that we incorporate facts from short-term memory to long-term memory through repetition. The students who dissected did so only once. Many of them passively looked at the organs during lab class, then went home and forgot everything. Meanwhile, I had to learn the relationships, associations and functions of the organs, so I actively referred to diagrams and atlases over and over again. The repetition paid off, because during my practical exam I answered 38 out of 40 questions correctly, responding to twice as many questions as the other students.

Once I knew that refusing to dissect could be accomplished successfully, I launched a campaign to get alternatives accepted on a wide scale. I collected literature on the subject, spoke with other students on the possibility, and eventually formed a petition requesting the department to offer an alternative to dissection. Then with persistence, and the help of a compassionate local veterinarian, I made an appointment with the lab coordinator, who told me that a human torso model would be made available to anyone unwilling to participate in dissection.

Later I met with the head of the department. He told me that an alternative method would be announced as an option to dissection. It was. And I was happy.

From my struggle to obtain a cruelty-free education, I've come to a conclusion: dissection is a tragedy of our school systems. It is a tragedy when students are forced to compromise their morals and ethics – a core part of their essence – to simply fulfill a course requirement; it is a tragedy that many students are turned off to the study of biology because of the ritual of dissection; it is a tragedy that these same compassionate students are often discouraged from entering health-related fields because of their convictions; it is a tragedy when many students deliberately avoid biology classes because they do not want to dissect; it is a tragedy that the tradition of dissection as a teaching tool has been so deeply entrenched in many teachers' minds, that other valuable lessons are often overlooked; it is a tragedy when students enter medicine with a deep compassion to help others but then have to learn to desensitize themselves to the suffering of animals under their care; it is a tragedy that students are denied innovative, alternative teaching techniques which may be more relevant to their educational needs and experiences.

Through these dark, dismal clouds, however, the sun is beginning to shine. There are students all across the United States who are rising above the narrow confines of our biology curricula to exert their right to a humane education. I would call these students "heroes", for they have passed the most challenging test: they have stood up for their beliefs despite condemnation; they have looked beyond mere tradition and have held on to the hope that they can choose a cruelty-free education.

These students are the pioneers for the development of a new educational system, one in which some day we will be able to look back upon the unnecessary suffering, both by animals and compassionate students forced to dissect, that used to take place in our schools and know that we were a part of a tremendous change.

Excerpts from: "Animals in Education, the Facts, Issues and Implications" by Lisa Ann Hepner, Richmond Publishers, Albuquerque, N.M. 1994

The Facts Behind Dissection

An estimated 8-12 million animals are used every year for educational purposes and at all levels of education, starting at elementary school. The biological supply companies that supply the animals to our schools are big businesses. Carolina Biological Supply Company grosses 25-30 million dollars annually and ships up to 3,000 animal orders a day! The killing and preparation of the animals is only a business for these companies, so there are numerous reported violations of the Animal Welfare Act that have been documented.

The number of students not wanting to perform dissection is increasing. According to one public school survey, 15-16% of the students surveyed reported that they and/or other students asked for alternatives. That is approximately 160 students out of every 1000 who will request an alternative to dissection. I anticipate the number will continue to grow. Sadly, many of these same students who requested an alternative also felt they would be penalized for such a decision.

– Lisa Ann Hepner

Coming To An Understanding

"I'm sorry, my teacher began, "but according to Pennsylvania Legislature's Senate Bill 727, an 'animal' is defined as 'any living organism of the kingdom animalia in the phylum chordata.' "Therefore, he continued, "a fly is not an 'animal' and I am going to have to ask you to conduct these experiments." I stared at him in disbelief. I could not comprehend in what way a fly was not an animal. I explained to him that I would not do something that conflicted with my beliefs and that I would not experiment with flies or work with materials from Carolina Biological Supply Company. He proceeded to make an appointment with my mother to discuss why I would no longer be able to remain in his course. He was going to have me taken out of A. P. Biology II in the middle of the year.

VOICES

After several lengthy talks with me and one with my mother, my teacher realized that my beliefs were sincere and how important they were to me. He decided to allow me to stay in class. Together, he and I worked out ways for me to conduct the separate studies that would allow me to obtain the same information as the other students. I made a presentation on mushroom flies to the class and talked with my classmates about their experimental results, benefiting both the rest of the class and me. Later in the year, I devised an experiment using potato catalase as opposed to catalase obtained from chicken liver and recorded my procedure so that it could be repeated by others. I set a precedent for future students who choose not to work with animal parts. I communicated very well with my teacher and we were able to work out compromises suitable to both of us.

by Elizabeth Hunt
a Senior at Unionville High School, PA

Final Challenge

Student Megan Southern overcame numerous obstacles in pursuit of her cruelty-free degree, only to be met with, and surmount, one final stumbling block:

"After spending years either avoiding dissection or having professors who were receptive and allowed alternatives, here I was having to take Genetics in order to graduate. Genetics: the class with an extensive fruit fly lab. In recent years, I had helped people who had trouble getting alternatives in some of the courses they were taking and had advocated the use of alternatives. No one had taken Genetics before and tried to get an alternative to using the fruit flies.

The majority of the labs for the term revolved around breeding fruit flies, killing and counting them. The first week of classes, I went and met with the professor and explained how I had moral objections to being involved with the fruit fly labs. She told me that I could learn just as much from the book and lab manual and if I did not want my own set of fruit flies, I did not have to take it. I will never forget the week in genetics where the professor announced that we were doing something else and that she would meet us in the computer lab. We were going to use computers to study the breeding of cats, relatively similar to the fruit fly experiment. This proved a different method of learning was possible and the use of animals was not necessary in this course."

Wittenburg University Student, Ohio

Talking To Teachers

Dear Science Teachers Everywhere,

I am writing this piece to voice my opinion on dissection. I think that dissection is morally, financially, and religiously (in some cases) wrong. The first amendment states, "Congress shall make no law respecting the establishment of religion or prohibiting the free exercise there of...". It is my religious belief that we were not put on this earth to be supreme beings and do whatever we want with nature. One of my favorite quotes is, "Humans aren't the only species on Earth, we just act like it".

An issue came up in my science class when we started our unit on life science. We were going to be performing dissections and observing the specimens; frogs and worms. Seeing that I don't believe in using animals for science, I wasn't about to cut one up. There are many, many alternative ways you can learn about worms, crayfish, frogs, etc. without performing dissection. There are high quality posters, slides, videos, books, and computer programs available, as well as natural observation. These alternatives range from no cost to several hundred dollars.

Our schools might say that it would cost too much to purchase alternatives, but, you see, a computer program is bought once and used over and over again. Once a frog is cut open, we're not about to sew it back together (although it would be nice). Another argument might be that dissection is included in the curriculum and we would be missing information that is required, but there is no difference in the knowledge gained through dissection and through alternatives. I did not perform the worm dissection in my classroom and I still got an "A" on the quiz. That shows you do not need to kill something to learn about it.

I'm not asking that you ban dissection altogether, (although it would be nice), I'm just saying that people should have a choice. I respect other peoples views and I hope they will respect mine.

The next time you are looking through the curriculum for the upcoming year, please think about alternatives to dissection. It will save lives and money.

Sincerely, Lori Kort

Lori Kort is a 13 year old student from Huntington, Vermont who contacted the AAVS for information on dissection alternatives. The previous essay was researched and written as an alternative project to her classroom dissection.

School Board Addressed

The time had finally come. I had three minutes to present weeks worth of research. I stated my name with an anxious and apprehensive voice when I began to address the school board. All eyes rested on the podium, and I had no idea what to expect.

In January, members of Central Bucks West Animal Rights Club decided to do something about the useless slaughter of animals for "education", that is, dissection. First, we had to do some major research in order to see the whole picture. In response to our letters and phone calls, the AAVS and other organizations sent an abundance of pamphlets, newsletters, and ideas. With the acquired materials, we put together a large bulletin board in the science wing of our school to introduce the issue to the student body.

Then we investigated the expenses of dissection in C.B. West through the head of the science department, and compared them to that of alternatives. Once a packet of information was together, it was time to speak with the Central Bucks School Board about discontinuing the outdated practice of dissection.

The reaction was positive. In the speech I stressed the educational and cost efficiency of alternatives; the board was very impressed by these facts. After discussion with board members, two newspaper reporters talked with me. The next day many teachers said that they saw an article in the local newspaper, *The Intelligencer*, and that this was a positive start. Later in the day, I was called in to see the principal. He personally offered his help and support.

The next step was to meet with the district science coordinator. He agreed to order some alternative products for trial to be presented to other teachers in the district in May or June of this year.

Now the C.B. West Animal Rights Group challenges you to take a step towards better education in our schools. Your voice can and does have an influence. Use it to save the millions of the voiceless.

Student, Christie Vischer
Doylestown, PA

BEST COPY AVAILABLE

Dissection & The Law

BY JONATHAN BALCOMBE, PH.D.
Associate Director for Education, Animal Research Issues
The Humane Society of the United States

In the past two decades, animal dissection has become a major controversy in life science education. And deservedly so, for dissection, as typically practiced in our schools, not only denies the rights of animals but also the rights of humans, specifically students who object to dissection on sincere ethical or religious grounds. Eight to twelve million animals are killed yearly to be dissected in U.S. classrooms, and an estimated 75% of American school children are at some point expected to dissect at least one animal. As the animal rights movement has grown, so too has public opposition to dissection. This article explores how that opposition is currently reflected in dissection legislation in the United States. I discuss existing laws, pending laws, their strengths and weaknesses, and what individuals can do to affect dissection law and policy in their communities.

U.S. Dissection Laws and Policies:

Four states currently have dissection laws: Florida, California, Pennsylvania, and New York. The provisions of these laws are summarized in Table I. Similar bills have been introduced in Massachusetts, New Jersey, Maryland, Rhode Island, and Illinois in the past few years, but none have passed. The greatest general benefit of having such laws is that they legitimize students' ethical objections to dissection. Among the specific benefits some of these laws provide are that students be notified beforehand that they may opt for humane alternatives, and that they not be penalized for doing so.

In addition to the above laws, which are further discussed below, many school boards have passed their own policies which require alternatives to be made available to students without penalty. One example is Prince George's County, Maryland, which has a progressive dissection policy that includes written notification to all students at the beginning of the course. In the absence of any policy, many schools and teachers will accommodate conscientious objectors. In a few rare cases, colleges, too have begun to adopt dissection choice policies or to implement dissection alternatives into the standard curriculum. Sarah Lawrence College, in New York, adopted a policy in 1994 that "does not require students with ethical objections to participate in dissection." Ramapo College, in New Jersey, has used a $25,000 grant from the Bernice Barbour Foundation to install a computer system that replaces animal labs. Many medical schools use no animals, and some veterinary schools are replacing lethal procedures on healthy animals with clinical intervention in their hands-on training.

Laws With Flaws:

While they are better than no law at all, the four U.S. state dissection laws have their weaknesses. These laws pertain only to K-12 students and not college-level students. Furthermore, only the Pennsylvania law includes private schools within its scope. Another problem is how the law defines "animal." The California law pertains to all animals, which basically means any living being who is not a plant or fungus. In contrast, the Pennsylvania law pertains only to animals with backbones, meaning that all invertebrates are fair game for a teacher who wants to require dissection of his or her students. The New York law doesn't define "animal," but a reference to "animals [and birds]" implies that only mammals are animals, which is not very reassuring if you're a frog! A potentially serious loophole exists for both the California and New York laws, which allow teacher discretion to determine that an alternative project is not feasible.

Notification and consent are two additional problem areas. That students be notified of their option to not dissect is vital, because the option is of little use if the student is not aware of it. Unfortunately, neither the Florida nor the New York laws require student notification. Regarding consent, Pennsylvania's is the only law that doesn't require the consent of a parent or guardian for the student to be granted a humane alternative. Given that the student has the most to gain or lose from the outcome, it is unfair that the remaining laws don't allow the student to choose.

THE

Student Rights Option

IN PENNSYLVANIA

In 1992, the Student Rights Option was passed in Pennsylvania giving K-12 students the right to an alternative to dissection. The law also required that students be informed of their right several weeks prior to the scheduled dissection. Having worked very hard to get this legislation passed in Pennsylvania, we at the AAVS were thrilled to see the Student Rights Option become law.

Unfortunately, our excitement has diminished as we have learned – through our ANIMALEARN presentations in schools as well as from students calling around the state – that the law is not being enforced.

In 1994, the AAVS wrote to the heads of life science departments in all the secondary schools in Pennsylvania informing them about the Student Rights Option and including a copy of the law. We offered to provide teacher in-service trainings in alternatives, as well as alternative materials by mail. We did not receive a single response to our offer.

Laws are only as good as their enforcement. Please follow Jonathan Balcombe's guidelines and become active in fighting for students' rights – even in states where laws have been passed. If you encounter resistance in the school system, or are a student faced with mandatory dissection, contact us at *(800) SAY-AAVS* for help.

Perhaps the greatest problem with dissection laws is that they are very hard to enforce. There is little to stop teachers who are determined to do animal dissections from applying subtle pressures on their students to participate. The National Anti-Vivisection Society, which operates the NAVS Dissection Hotline, The American Anti-Vivisection Society, and other animal protection organizations receive calls from many students in the four states with dissection laws, and students complain of being unaware that the law exists, and there being no indication that the teacher is aware of the law either. In a later section of this article I suggest ways to press for enforcement of dissection laws and policies.

TABLE I: U.S. State Dissection Laws.

PROVISIONS
Year Enacted
Grade Range
Private Schools
Notification of Student
Written Consent
Penalty for
Alternative Testing
Teacher Discretion
Definition of "Animal"
Experiments on Living Animals

Dispelling Dissection Myths:

Despite their flaws, these laws are far better than no laws. Getting them enacted is not usually easy, however; witness the repeated failure of dissection choice bills in other states. Resistance usually comes from members of the science teacher community who claim such laws would violate their academic freedom, from pro-vivisection organizations, and from elements of the private sector that have a vested interest in the continuation of animal research.

In order to lobby effectively for dissection choice laws or policies, it helps to be aware of underlying causes of resistance to such measures. Many educators don't support student choice regarding dissection because they perceive it to be a threat to their academic freedom, or their ability to dictate their own curriculum. For several reasons, this concern is largely unfounded. First, allowing students choice entails minimal infringement on academic freedom. Teachers are forbidden nothing; they simply add an optional procedure for some students. Second, there is value in providing students a choice in how they pursue an assignment, because doing so encourages students to think for themselves and to take responsibility for their own actions. Conscientious objectors exhibit concern and reflection, qualities to be lauded. Third, choice occurs regularly in the classroom when students are allowed to choose a topic for a science fair project or a subject or medium for a writing or art assignment, for instance. If allowing the student choice is palatable in such cases, it should be no less so for the study of animal anatomy.

Teachers and administrators also worry that providing choice in dissection could "open the floodgates" and result in students demanding choice on any number of topics. What if, for example, a student demands to be taught creationism in place of evolution? In fact, these are very different situations because one concerns teaching method while the other concerns course content. Unlike the hypothetical creationist who doesn't want to learn about evolution, the objector to dissection does want to learn about animal anatomy. It is the means by which the knowledge is acquired, and not the subject itself, to which the student's concerns are directed.

The reluctance of some biology teachers to use dissection alternatives may arise from a common perception that alternatives are inferior to dissection. This view is unscientific, for the evidence suggests otherwise. In the past decade more than a dozen studies have been published showing that students learn biology just as well, and sometimes better, using alternatives than they do using dissection or live animal experimentation. An annotated list of some of these studies is available from The Humane Society of the United States (HSUS).

What Can I Do?:

Whatever your position in the community (student, parent, activist, teacher), there are many steps you can take to improve existing dissection policy and bring attention to the issue. If you live in one of the four states with a choice-in-dissection law and want to find out if it's being enforced, you should first obtain a copy of the law and become familiar with it. Any national animal protection organization ought to have a copy of the law, or contact your state senator or state representative. Next, contact schools and find out if they have a dissection policy. If the answer is "yes," ask whether or not the students are being told. If they are not, and the school is unwilling to do so, tell them yourself.

Keep the pressure on. Raise the issue of enforcement in a letter to the science supervisor of your local school district. Send copies of your letter to all of the school principals in your district, and submit a letter to the editors of local newspapers. Your letter will be more powerful if it contains evidence that the law is not being enforced in your state. The National Anti-Vivisection Society can provide you with the number of callers to their NAVS Dissection Hotline from a given state. Almost all Hotline callers are students objecting to a required dissection assignment, so most calls from Florida, California, Pennsylvania and New York represent non-enforcement. As the issue gains visibility, students will want to come forward in support of dissection choice, and your campaign will gain momentum. Don't underestimate the power of one individual to effect change; California's choice-in-dissection law was the result of one student, Jenifer Graham, who challenged a required frog dissection at her school.

To get a state dissection bill introduced, you need to identify a state legislator who is willing to sponsor it. One option is to find a legislator with an animal-friendly voting record. Try to seek sponsorship by a legislator on the committee who would handle a dissection bill; otherwise it may become an "orphan bill" because there is nobody to watch over it as it goes through the committee process. Approach the legislator with material on the subject and simply ask him/her if he/she will sponsor it.

BEST COPY AVAILABLE

FLORIDA	CALIFORNIA	PENNSYLVANIA	NEW YORK
1989	1988	1992	1994
K-12	K-12	K-12	K-12 implied
Exempt	Exempt	Non-Exempt	Exempt
Parent/Guardian only	P/G and student	P/G and student	None Required
Required from P/G	Required from P/G	———	Required from P/G
———	No Penalty	No Penalty	No Penalty
———	Yes	Yes	———
No	Yes	No	Yes (for gr. 10-12)
Unclear: May be Only Mammals and Birds	Vertebrate and Invertebrate Animals	Vertebrate Animals Only	Unclear: May be Only Mammals and Birds
No Surgery on Mammals and Birds; Otherwise, No Physiological Harm Should Result	Forbidden Under Separate Education Code 51540	None. Explicitly Prohibited	Lists 16 Procedures as Prohibited (e.g., Surgery, Electric Shock, etc.)

Keep in mind that a legislator who is willing to introduce a bill is not necessarily willing to also work hard for its passage.

Once a bill has been introduced, there are several steps you can take to improve its chances of enactment. Sign up to testify on the bill when it reaches a hearing. Provide other members of the legislature with succinct, compelling information on the dissection issue and lobby them to support the bill. Do the same with other groups (e.g., parent-teacher associations, humane societies, rotary clubs, women's clubs, student groups); such groups need not have anything to do with animals, and the support base will be stronger if it not perceived only as representing animal welfare. Getting students to testify is important, for it points directly to the need for a dissection bill. Be sure to use the media (e.g., letters; radio talk shows), and national as well as local animal advocacy groups.

If a dissection bill fails to pass, the state department of education may wish to adopt it anyway. This happened with a progressive dissection choice bill in Maine in 1989. I thought the bill passed, but the Governor vetoed it. An alternative to the enforcement or enactment of dissection laws is a statewide policy adopted by the state department of education. Most, if not all states distribute materials to their students regarding their rights and responsibilities, and this is a good place to include a written statement regarding dissection choice. A statement similar to the following is currently under review by the Maryland State Department of Education for possible inclusion in their *Student Rights and Responsibilities Handbook*:

Informed Choice Regarding Dissection: Students shall be informed at the beginning of a course that uses animals for dissection or experiments that comparable alternative educational activities are available for their use. Alternative activities might include: textbook diagrams or pictures, videotape or film, computer simulation software or models. It follows that assessment, evaluation or testing on the educational objectives should also be provided by alternative methods. No student's grade shall be lowered for opting to do an alternative assignment.

Dissection on the Defensive!

With all of its problems – animal suffering, disturbed students, environmental disruption (through capture of frogs and other species from the wild), and evidence that it is not the best learning method – dissection ought to be on the way out. This is not yet the case, however. Dissection has the power of tradition on its side, and the ramparts of tradition don't fall easily without pressure. Dissection must be challenged at every opportunity. Students, parents and other concerned citizens must be heard on this issue. Your silence is another "yes" vote for more school orders of cats, frogs, and fetal pigs from the biological supply houses. Taking action in support of state laws or local policies is a worthwhile form of action, for it brings the issue into the foreground, and has the potential for long term, far reaching solutions.

BY F. BARBARA ORLANS, PH.D.

Written by F. Barbara Orlans, Ph.D., Kennedy Institute of Ethics, Georgetown University, Washington DC. Dr. Orlans holds degrees in both anatomy and physiology. Reprinted from Lab Animal Magazine October, 1995.

Prizes for Pain

Why the States Took Action

In the 1960s, mistreatment of animals in educational settings was widespread, especially at science fairs. High school science students would compete for prizes, often at the expense of animals. Some schools encouraged students with little scientific knowledge, and even less understanding of animal pain or concern about ethical constraints, to take on highly invasive animal projects. Often, scientific content was minimal and animal suffering great. Typical projects included administration of lethal or teratogenic doses of well-known poisons to small animals, and forced inhalation of cigarette smoke until the animals became sick or died (this to teach the youngsters not to smoke cigarettes). The fairs awarded prizes almost annually to teenagers who attempted crude monkey surgery (e.g., implanting brain electrodes or removing organs) and for experiments conducted in the youngsters' garages[1]. Unfortunately, while there have been some changes since the 1960s, many of these cruel projects still continue.

Humanitarians responded to the suffering they witnessed at science fairs by attempting to get science fair administrators and school officials to tighten up their rules. Repeated efforts failed, and so these public spirited individuals invoked legal pressures on the state level.

California[2] passed the first state law in 1973. The 1973 law, approved by Governor Ronald Reagan, states that in the public elementary and high schools or in school-sponsored activities, live vertebrate animals shall not be "experimentally medicated or drugged in a manner to cause painful reactions or induce painful pathological conditions [nor] be injured through any other treatments, including, but not limited to, anesthetization or electric shock[3]." The procedures mentioned were among those frequently encountered in science projects. Evidence about a project entitled "11 Hot Mice-See How They Run..." helped to get that law passed. A junior high school student conducted this project, and

exposed mice to infrared rays and reported on the resultant skin burns. The experiment was not atypical. Though the project lacked scientific merit and was crudely performed, it received an award.

California represents one of the largest and most influential public school systems, so this precedent-setting law had a beneficial effect nationwide in upgrading standards of animal treatment by adolescent youth. Several other states faced with similar problems passed comparable legislation.

Although standards have now improved considerably, a 1985 survey showed that projects that harm sentient animals are encountered more frequently than those that do not cause harm[3]. This survey of the prize-winning projects exhibited at the International Science and Engineering Fair showed that when participants chose vertebrate animals for study, four out of five projects harmed the animals. Out of a total of 77 projects involving vertebrate animals, 60 (78%) involved injury, pain, physical or psychological discomfort, or death; only 17 (22%) did not harm the animals.

Today, with an environment of general public acceptance of gratuitous violence, one wonders how participating in projects that harm animals has affected emotionally immature young people. Current rules permit teenagers to induce traumatic pathological conditions in vertebrate species (rheumatoid arthritis, hippocampal lesions, and burns), providing they meet some conditions. Does it make sense to attempt projects on pathological states without first having a sound understanding of normal physiology?

A view of recent standards is provided by Elinor Molbegott, a lawyer who attended the 1994 International Science and Engineering Fair which attracts 1.5 million competition entrants per year. Moblegou made this report[4]: "ISEF finalists' projects included electrically shocking the accessory sex glands of rams, injecting mice with parasites, feeding chicks a deficient diet, capturing pigeons in the street and killing them... and much more." Molbegott contrasted these projects with some prizewinning projects she has encountered at the Westinghouse Science Talent Search, a competition that enforces stringent, humane rules on animal use. Among these are studies of gopher relocation plans, dolphin populations, reproduction of rabbits, and the social behavior of animals at zoos.

National Policies on Novice Experimenters

The standards for novice experimenters in the US are unthinkable in some other countries and have brought censure. In 1991, the report of a working party organized by the Institute of Medical Ethics in the UK expressed "particular concern" over the use of animals in primary and secondary schools in the US, and exclaimed that the "rules of the International Science and Engineering Fair state that 'surgical procedures' may not be done at home."

Unlike some other countries, the United States has no enforceable national policy which requires a level of competency and scientific literacy before a person is allowed to start conducting animal experiments.

In Germany, England, Sweden, Denmark, and elsewhere, the law prohibits animal experimentation by primary and secondary school students. For instance, the 1986 German law states, "Only persons with the requisite expertise may conduct experiments on animals. Only persons who have completed university studies in veterinary medicine, medicine, or natural sciences may conduct experiments on vertebrates[5]."

Several attempts to establish national policies for the use of animals in primary and secondary schools have occurred in the US, but no consensus

Science Fair "Projects" Done In The Past

- **Rabbits are injected with steroids to investigate possible abnormalities that occur after prolonged use. Rabbits developed kidney, liver, skin and behavioral problems as well as inflammation of muscles.**
- **Mice are shocked in order to measure their ability to learn not to enter a dark chamber.**
- **Mice are injected with cancerous cells and given vitamin D and calcium to determine how these supplements affect the animals. Data was collected after the animals were "sacrificed."**
- **Rats are injected with steroids to see the effect. The animals are then bled to death.**
- **Two day old chicks are injected with aspartame (Nutrasweet) to see its effect.**
- **Rats have rubber bands tied around their tails to see how this stress affects the rats' ingestion of sweet milk.**
- **Gerbils are given MSG to see its adverse effects.**
- **Rats are given diabetes. Injections of drugs are administered and the rats' responses are compared with responses of non-diabetic rats.**
- **Rats are exposed to repeated cold conditions to measure the effect of exposure to repeated cold on food and water intake.**
- **Mice are placed on an exercise wheel, which is attached to a recording device to determine the effect exercise has on glucose levels.**

Provided by Elinor Moblegott, a New York based attorney working in conjunction with the National Anti-Vivisection Society (NAVS) to change current science fair regulations and promote a cruelty-free approach to education. Reprinted from the NAVS Bulletin.

Humane Science Fair Projects

COMPILED BY JONATHAN BALCOMBE, PH.D., ASSISTANT DIRECTOR FOR EDUCATION, THE HUMANE SOCIETY OF THE UNITED STATES

- **walk one's dog through the woods, then study the seeds that are dispersed by clinging to the dog's fur (if a dog is not available, an old blanket can be used instead).**
- **observe birds at a backyard feeder: for example, which species eat together? which species leave when other species arrive? which species eat which seeds/fruits/berries and why?**
- **collect, grow and study bacterial cultures from various places; examples: shoes, garbage cans, doorknobs, mouth; compare bacteria in mouth before and after brushing.**
- **sample plants from small plots on school grounds; relate their distribution to microhabitats, student activity patterns, etc.**
- **study absenteeism in school; relate to colds, flu, weather,....**
- **leaf and leafing adaptations (e.g., relate leaf shape and spread to habitat; effects of light availability).**
- **physiological self-study: e.g., hearing directionality; heart rate (relate to, e.g., eating, physical activity,...).**
- **use a water analysis kit to test water at various points along a river or stream, to associate bacterial contaminants and other things (turbidity) with sewer plants, run off, etc.**
- **(summer project) put up a bright light to attract bugs to a white sheet: identify the bugs while they are on the sheet; are the bugs the same in different areas?**
- **conduct a behavioral study of your companion animal(s) at home: e.g., to what sounds do they respond; compare response to different vocal inflections; observe closely sleeping pet and monitor body movements; frequency of REM sleep; examine play behavior.**

Each of the above studies (of which limitless variations can be conceived) can be tailored to suit the full range of student age groups, and designed to involve most or all of the key elements of the scientific process (study design, data collection and presentation, experimental manipulation, etc.)

has resulted. Progress is slow and no federal law exists. Quite properly, elementary and secondary schools are exempt from the Animal Welfare Act. (Since 1989, institutional oversight committees must review "those elements of... teaching procedures that involve the care and use of animals," but these relate to procedures conducted in USDA registered facilities, not procedures conducted in either primary and secondary schools or in youngsters' homes.)

Non-government groups have established American policies specific for secondary schools, including:

• The 1969 rules of the prestigious Westinghouse Science Talent Search which prohibit high school projects that harm vertebrate animals. These rules were adopted following an episode in which a 17-year-old won a $250 prize for blinding five sparrows and starving three of them to death. The Westinghouse rules have upheld sound humane standards without thwarting students' scientific achievements.

• The 1989 guidelines of the Institute of Laboratory Animal Resources (ILAR) of the National Academy of Sciences which state: "Students shall not conduct experimental procedures that are likely to cause pain or discomfort to the animal, interfere with an animal's health or well-being, induce nutritional deficiencies or toxicities; nor should students expose animals to microorganisms, ionizing radiation, cancer-producing agents, or any other harmful drugs or chemicals capable of causing disease, injury, or birth defects in humans or animals." These guidelines are not enforced nationally, although some areas have voluntarily adopted them.

The two leading professional teachers associations, the National Association of Biology Teachers (NABT) and the National Science Teachers Association (NSTA), have not reached any consensus. A few years ago, NABT adopted a policy that in many ways resembled ILAR's policy – with a key provision that does not allow students to subject vertebrate animals to "pain or distinct discomfort." But the policy went further: NABT recommended "where appropriate, alternatives to dissection," and that lab activities "should not cause the loss of an animal's life." Dissatisfaction with the policy, directed largely at the dissection issue, resulted in NABT watering down the policy. The 1992 NSTA policy sets no limit of degree of permissible animal pain and suffering other than ineffectively calling for "humane treatment."

While there has been some progress in ensuring that science fair projects in the U.S. are humane, we have a long way to go. Teachers, activists and others can help make sure that science fair projects do not include vivisection by monitoring science fairs when they are held locally, by writing to the directors of science fairs, and even by offering awards to students for excellent humane science projects. Monetary awards would both encourage students to develop such projects as well as raise awareness about persistent vivisection in secondary school science.

REFERENCES

1. For documentation of such projects, see Information Reports 17(2):1968. 17(4):1968. 18(2):1969. 19(1):1970. 19(2):1970. 21(3):1972. 21(4):1972. Animal Welfare Institute, Washington, D.C.
2. Humane Treatment of Animals. An act to amend the Education Code approved by Governor Reagan, June 1, 1973. Originally California Senate Bill 112.
3. Orlans, F.B. Science fairs--a sampling of misguided experiments. Scientists Center Newsletter; 7(3):1985.
4. Molbegott, E. New science fair criteria address vertebrate animal use. The American Biology Teacher, National Association of Biology Teachers Reston, VA, September 1995.
5. German Law on Animal Protection, Federal Minister of Food, Agriculture and Forestry. Bundesgesetzblatt, Part 1, Bonn, 22 August. English translation by the Services of the Commission of European Communities, p. 38, 1986.

The International Science and Engineering Fair (ISEF) is the annual culmination of thousands of local science fairs. The regulations set forth by this organization give students the right to perform various types of "research." These experiments can include exposing animals to radiation, carcinogens, toxic materials and physical stress. Surgery is also allowed, as are experiments in nutritional deficiency.

What You Can Do To Get Cruelty Out Of The Fair

- Write a letter to Science Service, 1719 N Street, NW, Washington, D.C., 20036. This is the organization that administers ISEF. Tell them you want the regulations changed immediately to read more like the Westinghouse Science Talent Search, which does not permit live vertebrate animal experimentation. (Science Service also administers the Westinghouse fair.)
- Write to the Board of Education in your area and urge it to also contact Science Service to suggest changes to the ISEF regulations.
- Attend local, state and regional science fairs in your area. You should be able to find out when and where they are being held from your high school science department. Document the projects you feel cause suffering, stress, pain or death to animals. Contact the organizers and sponsors of the fair and let them know how you feel about such cruelty. Also contact the AAVS to find out if further action is possible.
- Write to your local newspapers and television stations about this issue. Increase public awareness by letting people know what goes on at these competitions.
- If you are a parent, speak with teachers and other parents about the negative effects such experiments have on our children.
- If you are a student, talk with your teachers and fellow students about more humane science. Work on alternatives to animal experiments, study animals in their natural habitats, learn more about science without harming other creatures.

Provided by Elinor Moblegott, a New York based attorney working in conjunction with the National Anti-Vivisection Society (NAVS) to change current science fair regulations and promote a cruelty-free approach to education. Reprinted from the NAVS Bulletin.

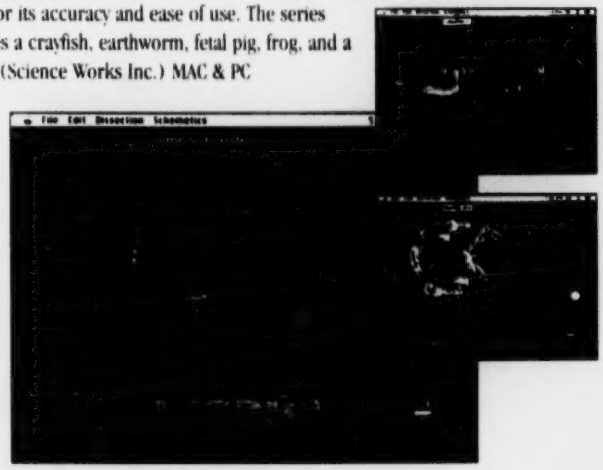
HALL OF FAME!

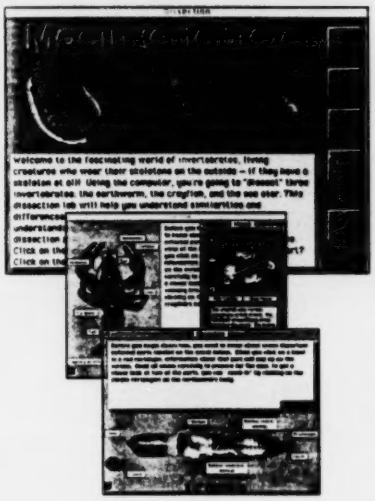
Our Dissection Alternative

Computer Simulations for Animal Studies:

Technological Dissection: The Series

Developed by four master science teachers, this is one of the most impressive and versatile computer dissection series available. Digitized photos of real animals with detailed diagrams give this program the "feel" that many science teachers are looking for. The students perform all aspects of dissection, from pinning the specimen to a dissection tray, to removing and labeling parts. The series has received wide praise by teachers and students for its accuracy and ease of use. The series includes a crayfish, earthworm, fetal pig, frog, and a perch. (Science Works Inc.) MAC & PC





MacInvertebrate and MacFrog

MacInvertebrate provides students with the opportunity to dissect three phyla of invertebrates on-screen: earthworm, sea star, and crayfish. By using the program, students will gain an understanding of the similarities and differences between these animals as they compare their digestive, respiratory, reproductive, nervous, circulatory, skeletal and excretory systems. *MacFrog* details five vertebrate frog systems including the mouth, digestive, circulatory, reproductive and skeletal systems. Both programs highlight key vocabulary words, and students can access their definitions instantly. (Intellimation) MAC

Charts, Models, and Other Media for Animal Studies:

The Great American Bullfrog

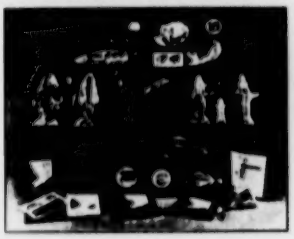
This twice natural size model has set a new standard for zoological models. This non-breakable, vinyl-plastic replica is the most detailed model available. It includes a removable heart which divides into anterior and posterior halves. The mandible, tongue and glottis remove for detailed study. Strategic cutaways reveal the bronchi of the lung, stomach rugae, and the lumen of the large intestine. Multi-level dissections expose the brain and nervous systems, the eye and optic nerve, and all of the bones of the skull and skeleton. More than 175 hand-numbered features are identified in the accompanying key. (Denoyer-Geppert)

The Concise Dissection Charts

These 8 1/2" x 11" charts use high resolution photography and microphotography to depict the complete dissection of a series of animals. Each part of the series is printed on both sides of stiff card stock that comes with a protective plastic sleeve. The series includes the clam, crayfish, earthworm, fetal pig, frog, grasshopper, perch, rat, and starfish. The charts can be ordered as a set or in any combination. (BioCam Communications, Inc.)

Zoology Models Activity Set

This set consists of seven models shown in raised relief, guide books and color transparencies. Each model illustrates internal structures in graphic detail and is capable of replacing the use of animals in the classroom. The full set includes the clam, crayfish, earthworm, fetal pig, frog, grasshopper and perch. Each animal can be purchased separately. (Hubbard Scientific)



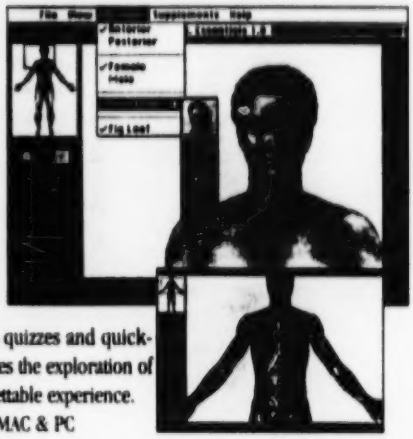
BEST COPY AVAILABLE

Help Us Make Alternatives Available to Students All Over The U.S.

The AAVS is developing a dissection alternatives library that will be available to students and teachers throughout the United States. This lending library will consist of the best computer programs, models, charts, videos and slide shows made today. We will make these available to any students, teachers, or school systems, that are in need of methods to eliminate dissection – ***Free Of Charge!*** This will be an invaluable resource to the many students who are not able to get an alternative because the life sciences department cannot afford one or refuses to provide one. You can help us develop our library by making a donation to this special project. All contributions made will go directly to purchasing alternative resources for students in need. You can use the business reply envelope at the center of this magazine to make your contribution.

Computer Simulations for Human Studies:

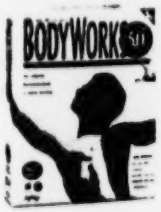
A.D.A.M.



A.D.A.M. (Animated Dissection of Anatomy for Medicine) is a comprehensive human anatomy computer program. Used mainly for college education, (but quite suitable for high school), A.D.A.M. allows students to dissect layer upon layer of the human anatomy. With interesting and humorous quizzes and quicktime movies, A.D.A.M. makes the exploration of human anatomy an unforgettable experience. (A.D.A.M. Software Inc.) MAC & PC

Body Works

The Body Works is an impressive computer program that explores the human body's systems, structure and functions. Colorful, comprehensive graphics guide the student on a journey through the entire body. A complete database allows for a detailed examination of every facet of the human body, from head to toe. (Softkey International) MAC & PC



A.D.A.M. Software, Inc.
1600 River Edge Pkwy.
Suite 800
Atlanta, GA 30328
(800) 755-ADAM

BioCam Communications
Box 8110-12
Blaine, WA 98230
(800) 667-3316

Denoyer-Geppert Science Co.
5235 N. Ravenswood Ave.
Chicago, IL 60640
(800) 621-1014

Hubbard Scientific
P.O. Box 2121
Ft. Collins, CO
80522-2121
(800) 289-9299

Intellimation
131 Cromona Dr.
Santa Barbara, CA 93116
(800) 346-8355

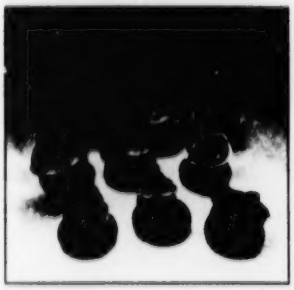
Science Works Inc.
808 Retford Cir.
Winston-Salem, NC 27104
(910) 712-0353

Softkey International
1 Antheneum St.
Cambridge, MA 02142
(800) 227-5609

Charts, Models and Other Media for Human Studies:

Anamods. Grades 8-12

These detailed, multi-sectional, full color reproductions of nine human body organs and systems, are designed to introduce the student to anatomical and physiological structures and functions of each organ or system. *Anamods* are made of rugged vinyl and are designed to provide hands-on learning. Models include: human heart, brain, kidney, liver, lungs, eye, ear, and reproductive systems. The Anamod comparative anatomy package demonstrates comparative differences between the hearts and brains of a human, bird, amphibian, reptile and fish. Each Anamod comes with illustrations and descriptive text about functions and locations. (Hubbard Scientific)



The Thin Man, Sequential Human Anatomy Program

The Thin Man is a near life-size, full-color rendition of the human body which, by means of a sequence of transparent mylar overlays, allows the peeling away of layer after layer of tissue, progressing more deeply into the body. The design of The Thin Man provides valuable insight into the three-dimensional spatial relationships of principal structures, major vessels and organ systems. The Thin Man stands just over 5 ft. tall and is mounted on warp-proof composition board. (Denoyer-Geppert)

GREAT RESOURCES FOR DISSECTION INFORMATION!

What's the Deal With Dissection?*
The AAVS' guide to the problems with dissection and some helpful tips on getting an alternative.

AAVS Guide to Non-Animal Dissection Alternatives*
Some of our choices of the best alternatives to dissection that are available. The brochure lists a number of alternatives that would fit into any school budget and includes descriptions and ordering information.

Dissection and Student Rights: Alternatives, Actions and Ideas to Make Science Classes More Humane*
A brochure that makes the case for a student's right to a dissection alternative. The brochure lists some common myths and facts in the dissection debate along with types of alternatives and a "what you can do" section on getting students' rights laws passed in your state.

Vivisection & Dissection in the Classroom: A Guide to Conscientious Objection*
This book gives a comprehensive overview of the legal arguments that students could use in their case for alternatives. A thorough discussion of legal issues, as well as case histories, pertinent laws and legal briefs are included.

Animals in Education: The Facts, Issues and Implications*
The most thorough resource on dissection available. This book covers alternatives, common misconceptions, benefits of alternatives, student rights issues and much more.

Beyond Dissection
The most comprehensive listing of alternatives to dissection available. Thorough descriptions, pricing, and ordering information, as well as photos of selected items is included. Available from The Ethical Science Education Coalition, 167 Milk Street, #423, Boston, MA 02109, (617) 367-9143.

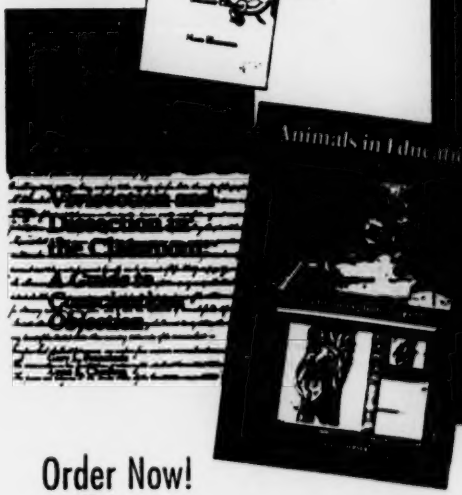
Alternatives in Medical Education
A listing of alternatives that can be used in medical training. Available from Physicians Committee for Responsible Medicine, P.O. Box 6322, Washington, DC 20015 (202) 686-2210.

NORINA
A database of thousands of alternatives to dissection and vivisection. This is a very powerful and nicely indexed listing of alternatives for those with computers. Available from Dr. Adrian Smith, Laboratory Animal Unit, Norwegian College of Veterinary Medicine, P.O. Box 8146, Dep. 0033, Oslo 1, Norway.

AVAR Listing
A listing of alternatives that can be used in veterinary medical training. This booklet also reproduces policy statements on alternatives from most of the veterinary schools in the U.S. Available from Association of Veterinarians for Animal Rights, P.O. Box 6269, Vacaville, CA 95696 (707) 449-1391.

* Available from The AAVS. See ordering information on the right. We also have dissection information on our world wide web site. Just aim your web browser at *www.aavs.org*.

DISSECTION MATERIALS AVAILABLE FROM AAVS



T-Shirt: $15.00

Button and Bumper Sticker: $1.00 each

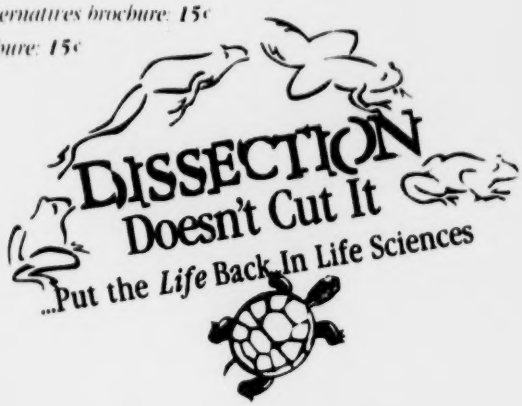
Animals In Education: $12.95

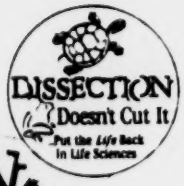
Vivisection and Dissection in the Classroom: $4.95

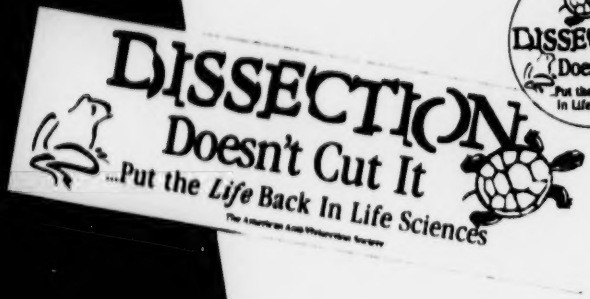
What's the Deal With Dissection brochure: 20¢

Non-Animal Dissection Alternatives brochure: 15¢

Dissection and Student Rights brochure: 15¢







Order Now!

ITEM NUMBER	QUANTITY	DESCRIPTION	PRICE EACH	PRICE BULK*	TOTAL COST

NAME _____

STREET _____

CITY _____

STATE _____ ZIP _____

SHIPPING RATES:

$ 2.00 - 5.00	Add $2.00
5.01 - 10.00	Add $3.00
10.01 - 20.00	Add $4.00
20.01 and up	Add $5.00

INTERNATIONAL ORDERS CALL FOR POSTAGE RATES 215.887.6816

SUB TOTAL	$ _____
PA RESIDENTS- (6% SALES TAX)	_____
SHIPPING	_____
TOTAL	$ _____

❑ VISA ❑ MasterCard check one

CREDIT CARD NO. _____

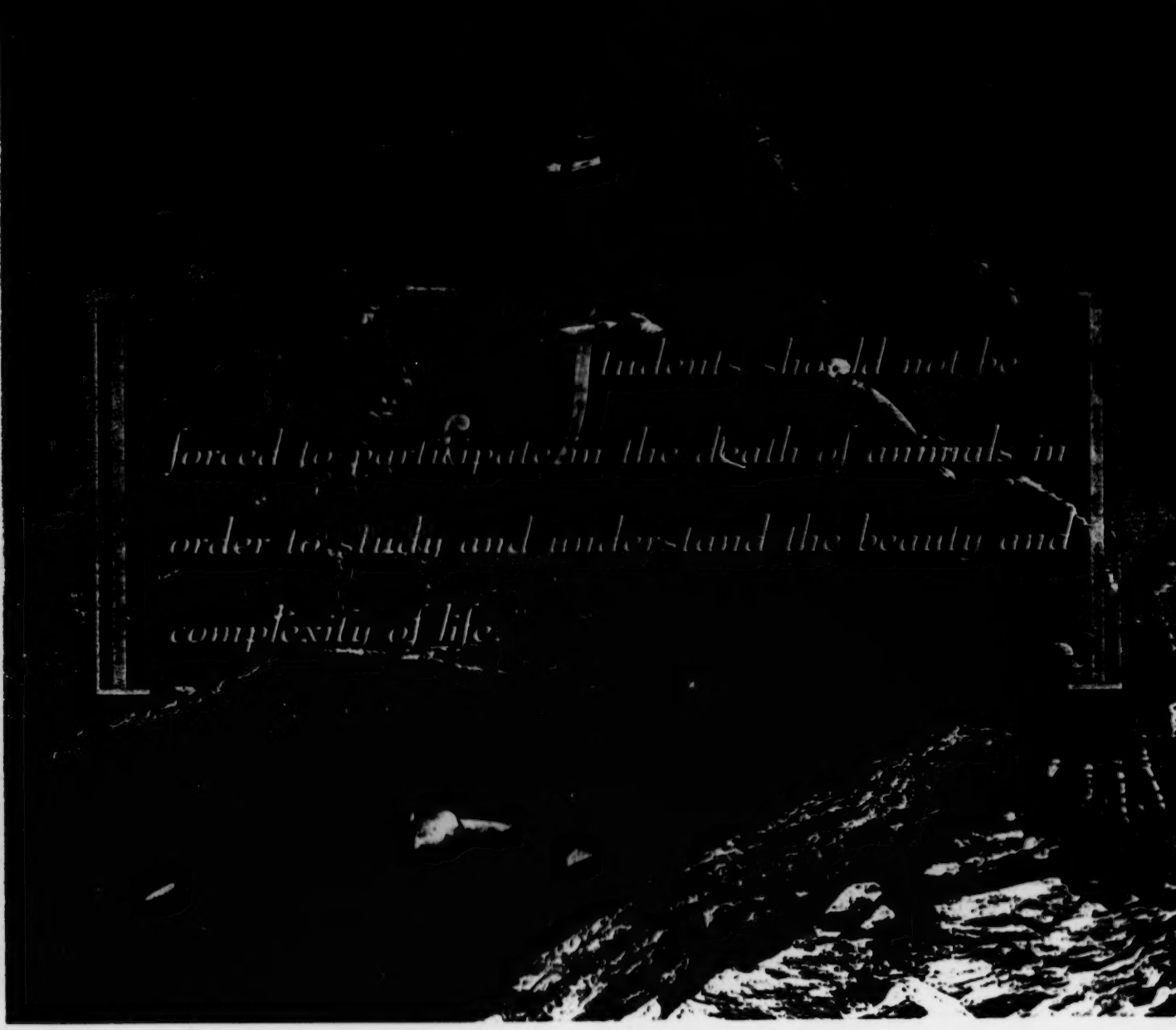
EXPIRATION DATE _____

SIGNATURE _____

UPS DELIVERY — PROVIDE A STREET ADDRESS ALLOW 2-4 WEEKS FOR DELIVERY

Minimum order $2.00. *(Bulk rate quotes: call 800-SAY-AAVS)

BEST COPY AVAILABLE


Students should not be
forced to participate in the death of animals in
order to study and understand the beauty and
complexity of life.

The American Anti-Vivisection Society
801 Old York Road, #204
Jenkintown, PA 19046-1685

A Non-Profit Educational Organization
Dedicated to the Abolition of Vivisection

NON-PROFIT
THIRD-CLASS MAIL
U.S. POSTAGE
PAID
MORGANTOWN, PA
PERMIT NO. 107

BEST COPY AVAILABLE

Printed on recycled paper.